

Supplementary Material for Bachovchin, D.A. et al. PNAS manuscript

Supplementary Text

Carboxylesterases (CESs) are a sub-family of serine hydrolases (SHs) predominantly expressed in liver that play important roles in the metabolism of drugs and other xenobiotic compounds, as well as some natural substances (acylglycerols, acyl-CoAs) (1). There are 5 and 19 CESs encoded by the human and mouse genomes, respectively. The broad substrate scope of CESs is mirrored by promiscuous cross-reactivity with SH-directed inhibitors, as has been documented in many previous studies (2-4). Consistent with this past work, we observed CESs as common off-targets for most of our carbamate hits. While this off-target activity could complicate the use of carbamates for pharmacological studies in liver, it should not present a problem for the characterization of SH function in most other tissues or cell models. Indeed, there are several examples of carbamates, including the FAAH inhibitor URB597 (5) and the MAGL inhibitor JZL184 (6), that have proven very useful for studying SHs in complex processes such as the nervous system (5, 6), immune system (7), and cancer (8), despite showing some CES-cross reactivity (4, 9). The common feature among these carbamates is that they show high selectivity for individual SHs outside of the CES sub-family (4, 6). We have therefore placed a similar requirement on the lead carbamate hits emerging from our library-versus-library competitive ABPP screen, such as those listed in Table 1A. Each of these inhibitors shows high selectivity (> 10-fold) for the designated SH relative to other non-CES SHs, and

their cross-reactivity with CESs is similar in scope to that observed with established pharmacological probes like URB597 and JZL184 (see Table S3). We therefore believe that these carbamate hits represent valuable leads for developing selective SH inhibitors that can be applied to a wide range of cell and animal models. In cases where CESs cross-reactivity remains a concern, control pharmacological studies can be conducted with carbamate inhibitors that lack activity against the target of interest, but maintain CES inhibition, as we have shown previously (10).

METHODS:

Materials. FP-biotin (11, 12), FP-rhodamine (13), and JZL184 (6) were synthesized following previously described protocols. Full-length cDNAs encoding SHs were purchased from Open Biosystems unless otherwise indicated (Table S2). URB597 was purchased from Cayman Chemical.

Preparation of mouse tissue and cell line proteomes. The soluble and membrane fractions from mouse tissue and cell lines were generated following previously described methods (14). Briefly, mouse tissues were Dounce-homogenized in PBS (pH 7.5) followed by a low-speed spin (1,400 $\times g$, 5 min) to remove debris. The supernatant was then subjected to centrifugation (64,000 $\times g$, 45 min) to provide the soluble fraction as the supernatant and the membrane fraction as the pellet. The pellet was washed twice and resuspended in PBS buffer by sonication. RAW264.7 (mouse macrophage cell line) cells were grown in DMEM with 10% FCS and 40 mM L-glutamine at 37°C and 5% CO₂. RAW264.7 cells were washed two times with DMEM (serum-free) and resuspended in 0.05% fatty acid free BSA (Sigma) in DMEM. Cells were counted and replated at 10 million cells per 10 cm dish with 0.05% BSA in DMEM (10 ml final volume). LPS (Sigma L-4391) was resuspended in PBS and 10 µgs/ml was added or an equal amount of PBS to each dish. Cells were incubated for 24 hours and the secreted and cellular proteomes were isolated

using standard procedures. Briefly, conditioned media samples were centrifuged (2,400 \times g, 5 min), the protein content of the supernatant was precipitated with ammonium sulfate (80%), resuspended in PBS (pH 7.5), and desalted over a PD-10 column (GE Healthcare) to provide secreted proteome fractions. Cell pellets were sonicated in PBS and centrifuged (64,000 \times g, 45 min) to provide the soluble fraction as the supernatant and the membrane fraction as the pellet. The pellet was resuspended in PBS by sonication. UACC257 cells were grown to 80% confluence in DMEM containing 10% FCS and at 37°C before the media was replaced with serum-free DMEM. After 48h, conditioned media was isolated as described above. Total protein concentration of each fraction was determined using a protein assay kit (Bio-Rad). Samples were stored at -80°C until use.

Cell and tissue profiling with FP activity-based probes. For gel-based ABPP experiments (Fig. 1A and Fig. S2), proteomes (1 mg/mL) were treated with 2 μ M FP-rhodamine for 45 min at 25 °C (50 μ L total reaction volume). Reactions were quenched with one volume of standard 2x SDS-PAGE loading buffer (reducing), separated by SDS-PAGE (10% acrylamide), and visualized in-gel with a Hitachi FMBio IIe flatbed fluorescence scanner (MiraiBio).

FP-reactive serine hydrolases were identified from mouse tissue and cell line proteomes by ABPP-MudPIT. Proteomes were adjusted to a final protein concentration of 1.0 mg/mL and were labeled with 5 μ M of FP-biotin (1 mL total reaction volume) for 1 hr at 25 °C. After incubation, the membrane proteomes

were solubilized with 1% Triton-X and rotated at 4°C for 1 hr. Enrichment of FP-labeled proteins was achieved as previously described(14, 15). The avidin-enriched proteome was washed two times for 8 min with (1) 1% SDS, (2) 6 M Urea, (3) PBS (pH 7.5) and finally resuspended in 200 µL 8 M urea. Samples were then prepared for on-bead digestion by reduction with 10 mM TCEP (Sigma) for 30 min at 25 °C and alkylated with 12 mM of iodoacetamide (Sigma) for 30 min at 25 °C in the dark. Samples were diluted to 2 M urea with PBS (pH 7.5) and digestions were performed for 12 hr at 37 °C with trypsin (Promega; 3 µL of 0. µg/µL) in the presence of 2 mM CaCl₂. Lastly, peptide samples were acidified to a final concentration of 5% formic acid.

Digested peptide mixtures were pressure-loaded on to a biphasic (strong cation exchange/reverse phase) capillary column and analyzed by two-dimensional liquid chromatography (2D-LC) separation in combination with tandem mass spectrometry as previously described (15, 16) using an Agilent 1100-series quaternary pump and Thermo Scientific LTQ ion trap mass spectrometer. Peptides were eluted in a 5-step MudPIT experiment (using 0%, 10%, 25%, 80%, and 100% salt bumps of 500 mM aqueous ammonium acetate) and data were collected in data-dependent acquisition mode with dynamic exclusion turned on (60 s, repeat of 1). Specifically, one full MS (MS1) scan (400-1800 m/z) was followed by 7 MS2 scans of the most abundant ions. The MS2 spectra data were extracted from the raw file using RAW Xtractor (version 1.9.1; publicly available at <http://fields.scripps.edu/?q=content/download>). MS2 spectra data were

searched using the SEQUEST algorithm (Version 3.0) (17) against the latest version of the mouse IPI database concatenated with the reversed database for assessment of false-discovery rates (18). SEQUEST searches allowed for variable oxidation of methionine (+16), static modification of cysteine residues (+57 due to alkylation), and no enzyme specificity. The resulting MS2 spectra matches were assembled into protein identifications and filtered using DTASelect (version 2.0.41) (19) using the --trypstat option, which applies different statistical models for the analysis of tryptic, half-tryptic, non-tryptic peptides. DTASelect 2.0 uses a quadratic discriminant analysis to achieve a user-defined maximum peptide false positive rate; the default parameters (maximum false positive rate of 5%) was used for the search; however, the actual false positive rate was much lower (1%). The total proteomic data was filtered for serine hydrolases manually (see **Serine hydrolase informatics** below) (Table S1). SHs that displayed an average of ≥ 5 spectral counts from three independent runs with ≥ 5 -fold higher spectral counts in FP-biotin-treated proteomes compared to “no-probe” control proteomes in at least one tissue were considered as FP reactive. Hierarchical clustering of the resulting data set was performed using the averaged linkage method with Pearson correlation coefficient as the similarity metric, and the results were visualized using TreeView software (<http://rana.lbl.gov/EisenSoftware.htm>).

SH superfamily informatics. The metabolic SH family is comprised of proteins that utilize a nucleophilic serine to effect hydrolysis. However, several different

evolutionarily-unrelated catalytic domains are known to use this mechanism, making codification of the family difficult. For the purposes of this study, the metabolic serine hydrolase family was defined by starting with a list of prototypical metabolic serine hydrolases from different classes (e.g. ATGL, HSL, PLB1, FAAH, etc) and identifying InterPro(20) annotations that correspond to their catalytic domains (e.g. IPR002641: Patatin-like phospholipase, IPR002168: GDXG-family lipase, IPR001087: GDSL-family lipase, IPR000120: amidase, etc). These InterPro identifiers were then used to query the Ensembl database (21) to produce a non-redundant (gene-centric) but comprehensive list containing all genes harboring each domain type. This list was manually curated and pruned to remove entries lacking catalytic residues [e.g. neuroligins, which have a carboxylesterase domain (IPR002018) but lack a catalytic serine] and apparent pseudogenes. The trypsin-family serine proteases are more evolutionarily homogeneous, therefore estimation of the number of serine proteases in the genome was achieved by simply querying the Ensembl database with the InterPro domain for trypsin-like serine proteases (IPR009003).

To construct the dendrogram (Fig. 1C), the catalytic serine nucleophile of each mSH was identified and a sequence alignment anchored around this residue was constructed using the DIALIGN algorithm (22).

Recombinant expression of SHs. SHs were expressed or obtained from endogenous sources as indicated in Table S2. 64 SHs were recombinantly

expressed COS7 or HEK293 cells. Briefly, cells were grown to ~60% confluence in 15 cm dishes (~2 dishes/SH) in complete medium (DMEM with L-glutamine, nonessential amino acids, sodium pyruvate, and 10% FCS) at 37°C and 5% CO₂. The cells were then transiently transfected by using the appropriate gene cloned into a mammalian expression vector or empty vector control (“mock”) and the FUGENE 6 (Roche Applied Science) transfection reagents following the manufacturers’ protocols. After 48 hrs, the cells were washed twice with phosphate-buffered saline (PBS), collected by scraping, resuspended in 0.5 mL PBS, and lysed by sonication. A handful of enzymes (ABHD14B, PNPLA2, DDHD2, SEC23IP) were purified in a single step using the FLAG Immunoprecipitation Kit (Sigma) according to manufacturers’ instructions after expression in 293T cells. FASN was screened endogenously in 239T lysates. SHs obtained from UACC257 (PLA1A, BCHE, CTSA, SIAE) and RAW264.7 (LPL) conditioned media were prepared as described above. Finally, two enzymes (PAFAH1B2 and PAFA1B3) were expressed in BL21(DE3) *E. coli*. Briefly, genes encoding these SHs were subcloned into pET45b (Novagen) and transformed into BL21(DE3) *E. coli*. Bacteria were grown in LB media containing 75 mg/L carbenicillin with shaking at 37 °C to an OD₆₀₀ of 0.5. The cells were then induced with 1 mM IPTG and harvested 4 hours later by centrifugation. Protein was purified as described previously (23), and yielded pure (> 95% by SDS-PAGE) enzymes at ~1 mg/L of culture. Aliquots of all SHs were stored at -80 °C until use.

Primary screening by gel-based ABPP. Recombinant and endogenously harvested SHs were initially labeled (1 mg/mL of lysate or 1 μ M purified enzymes) with FP-rhodamine (2 μ M) for 45 min at 25 °C (25 μ L total reaction volume). Reactions were quenched with one volume of standard 2x SDS-PAGE loading buffer (reducing), separated by SDS-PAGE (10% acrylamide), and visualized in-gel fluorescence scanning. Typically, 3-6 gel-resolvable SHs were then combined for the primary screen. Combined SHs and a corresponding mock lysate were incubated with DMSO or indicated compound (50 μ M) for 45 min at 25 °C before the addition of FP-rhodamine (2 μ M) for an additional 45 min at 25 °C. These reactions were quenched, separated by SDS-PAGE, and visualized by in-gel fluorescence scanning. Primary screening data is shown in Fig. S4 and hit compounds are listed in Table S3. Heat maps for hit compounds were created using the clustering software described above.

Determination of IC₅₀ values.

Compounds selected for determination of IC₅₀ values were resynthesized to confirm activity and incubated at the indicated concentrations (performed in triplicate) for 45 min at 37 °C prior to FP-labeling for 45 min, quenching, separation by SDS-PAGE, and visualization by in-gel fluorescence scanning. The percentage activity remaining was determined by measuring the integrated optical intensity of the bands using ImageJ software. IC₅₀ values were determined from a dose-response curve generated using Prism software (GraphPad).

ABPP-MudPIT analysis of SHs targeted by carbamates *in vivo*. C57BL/6

mice were treated intraperitoneally with vehicle (90:5:5 Saline:Castor Oil:DMSO), WWL222 (10 mg kg⁻¹), or WWL123 (20 mg kg⁻¹) at 10 µL/g for 4 hours. The membrane and soluble proteomes of brains from these mice were harvested and analyzed by ABPP-MudPIT using the FP-Biotin probe as described above.

Synthetic Methods

General method. All chemicals were obtained from Aldrich, Acros, Fisher, Fluka or Maybridge and were used without further purification, except where noted. Dry solvents (tetrahydrofuran, dichloromethane, and toluene) and triethylamine were obtained by passing these through activated alumina columns. All reactions were carried out under an inert nitrogen atmosphere using oven-baked glassware unless otherwise noted. Flash chromatography was performed using 230-400 mesh silica gel 60. ¹H spectra were recorded on a Bruker DMX-600 MHz spectrometer. Chemical shifts are reported in δ values relative to tetramethylsilane, and coupling constants (J) are reported in Hz.

Method A (WWL1-WWL40, WWL42-WWL71, synthesis shown for WWL1 2-methylnaphthalen-1-yl 3,5-dimethylphenylcarbamate): Using a modification of the procedure of Mor and colleagues(24), 2-methylnaphthalen-1-ol (0.079 g, 0.50 mmol, 1.0 equiv) was suspended in toluene (5 mL) and triethylamine (7.7 µL, 0.55 mmol, 1.1 equiv) was added. To this was added a solution of 1-isocyanato-

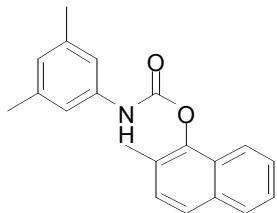
3,5-dimethylbenzene (0.081 g, 0.55 mmol, 1.1 equiv) in toluene (1.5 mL, 0.37 M).

The reactants were heated at reflux overnight. Solvent was removed via rotary evaporation under reduced pressure. Column chromatography (3:1 hexane/ethyl acetate) afforded **WWL1** as a white solid.

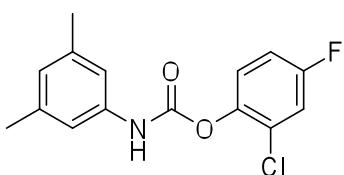
Method B (WWL41, WWL72-WWL155, WWL158, WWL201-232, synthesis shown for WWL41 2-methylnaphthalen-1-yl cyclohexylcarbamate): Using a modification of the procedure of Kidd and colleagues (11), 2-methylnaphthalen-1-ol (0.079 g, 0.50 mmol, 1.0 equiv) was suspended in 4 mL CH₃CN and N,N'-disuccinimidyl carbonate (0.77 g, 3.0 mmol, 6.0 equiv) and triethylamine (14 µL, 1.0 mmol, 2.0 equiv) were sequentially added into solution. The mixture was stirred at room temperature for 2 hours and monitored by TLC. When the reaction was complete, the mixture was poured into 10 mL EtOAc, washed with 5 mL 5% citric acid and 5 mL saturated NaCl. The organic layer was dried over anhydrous Na₂SO₄. Solvent was removed via rotary evaporation under reduced pressure, and this intermediate was directly used without further purification. The intermediate was dissolved in 5 mL CH₂Cl₂, cyclohexanamine (0.049 g, 0.50 mmol, 1.0 equiv) and triethylamine (7.0 µL, 0.5 mmol, 1.0 equiv) were added into the mixture, the reaction was monitored by TLC. The typical reaction was around 2 hours. The reaction was diluted in 20 mL EtOAc, washed with 10 mL 5% citric acid and saturated NaCl twice. The solvent was removed by rotary evaporation under reduced pressure to provide a pale yellow oil. Column chromatography (4:1 hexane /ethyl acetate) afforded **WWL41** as a white powder.

Method C (WWL156-WWL157, WWL161-WWL173, WWL233-WWL242, synthesis shown for WWL164 4-nitrophenyl 4-(9H-xanthen-9-yl)piperazine-1-carboxylate): Using a modification of the procedure of Kidd and colleagues (11), to a stirring solution of N-Boc piperazine (100 mg, 0.54 mmol) in CH_2Cl_2 (5 mL) was sequentially added 4 nitrophenylchloroformate (109 mg, 0.54 mmol) and Et_3N (75 μL , 0.54 mmol) at room temperature. After 3 h, the mixture was concentrated in vacuo. Purification of the crude mixture via flash chromatography (3:1 Hex/EtOAc) gave intermediate (160 mg, 83%yield): $^1\text{H}\text{NMR}(\text{CDCl}_3, 600\text{MHz}) \delta$ 8.24 (d, $J=9$ Hz, 2H), 7.31 (d, $J=9$ Hz, 2H), 3.67-6.61 (b, 2H), 3.54-3.47 (b, 6H), 1.50 (s, 9H). To the intermediate (100 mg, 0.28 mmol) was added 1:1 v/v TFA/ CH_2Cl_2 (2 mL) at room temperature. After 2 h, the mixture was concentrated in vacuo to afford crude 4-nitrophenyl piperazine-1-carboxylate, which was used without further purification. To a stirring solution of 9H-xanthene-9-one (98mg, 0.5 mmol) in EtOH (5 mL) was added NaBH_4 (38 mg, 1 mmol) at room temperature. After 4 h, the mixture was poured onto water (10 ml), stirred for 1 h, and then the product was filtered off, dried, and used directly in the next step. To the crude product in CH_2Cl_2 (5 mL) was added sulfuric dichloride (52 μL , 0.6 mmol) and Et_3N (84 μL , 0.6 mmol) dropwise at room temperature. After 2 h, the mixture was concentrated in vacuo to afford crude 9-chloro-9H-xanthene. Crude 9-chloro-9H-xanthene was redissolved in CH_3CN (10 mL), and to it was sequentially added crude 4-nitrophenyl piperazine-1-carboxylate and Et_3N (70 μL , 0.5 mmol). After the reagent addition was complete, the mixture was heated

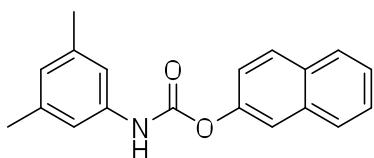
to reflux overnight. The next morning, the mixture was concentrated in vacuo. Purification of the crude mixture via flash chromatography (1:1 Hex/EtOAc) gave **WWL164** (201 mg, 73% yield over three steps).



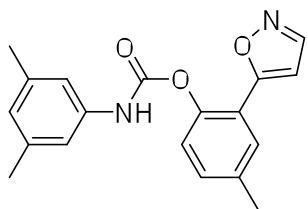
1: 2-methylnaphthalen-1-yl 3,5-dimethylphenylcarbamate 78% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.90-7.51 (m, 6H), 7.20 (m, 3H), 5.03 (b, 1H), 2.42 (s, 3H), 2.31 (s, 6H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{19}\text{NO}_2$, 306.1489; found, 306.1485.



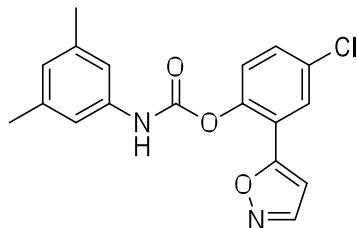
2: 2-chloro-4-fluorophenyl 3,5-dimethylphenylcarbamate 83% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.25-7.18 (m, 2H), 7.07 (s, 1H), 7.00-6.97 (m, 2H), 6.77 (s, 1H), 2.30 (s, 6H); **HRMS** (m/z). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{15}\text{H}_{13}\text{ClFNO}_2$, 294.0691; found, 294.0697.



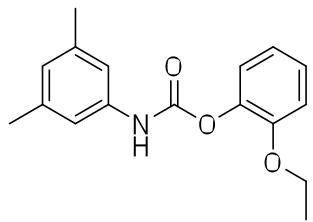
3: naphthalen-2-yl 3,5-dimethylphenylcarbamate 67% $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.85-7.83 (m, 3H), 7.64-7.63 (m, 1H), 7.47-7.46 (m, 2H), 7.33-7.31 (m, 1H), 7.09 (s, 2H), 6.75 (s, 1H), 2.30 (s, 6H); **HRMS** (m/z) $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{17}\text{NO}_2$, 292.1331; found, 292.1337.



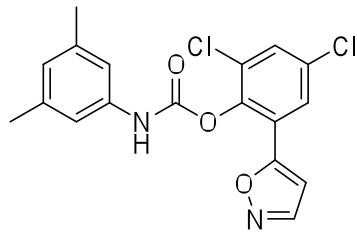
4: 2-(isoxazol-5-yl)-4-methylphenyl 3,5-dimethylphenylcarbamate 69% $\text{A}^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.26-8.25 (m, 1H), 7.75-7.74 (m, 1H), 7.25-7.17 (m, 4H), 6.76-6.54 (m, 2H), 2.42 (s, 3H), 2.30 (s, 6H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{18}\text{N}_2\text{O}_3$, 323.1389; found, 323.1387.



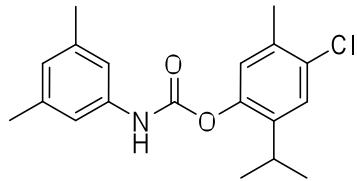
5: 4-chloro-2-(isoxazol-5-yl)phenyl 3,5-dimethylphenylcarbamate 74% $\text{A}^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.97-7.96 (m, 1H), 7.62-7.60 (m, 2H), 7.42-7.39 (m, 1H), 7.05-7.01 (m, 2H), 6.75-6.67 (m, 2H), 2.27 (s, 6H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{15}\text{ClN}_2\text{O}_3$, 343.0844; found, 343.0848.



6: 2-ethoxyphenyl 3,5-dimethylphenylcarbamate 63% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.19-7.16 (m, 2H), 7.09 (s, 2H), 6.99-6.96 (m, 2H), 6.75 (s, 1H), 4.11 (q, $J=7\text{Hz}$, 2H), 2.30 (s, 6H), 1.39 (t, $J=7\text{Hz}$, 3H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{19}\text{NO}_3$, 286.1437; found, 286.1436.

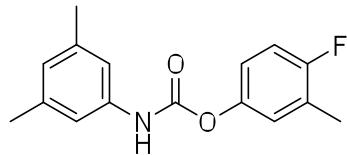


7: 2,4-dichloro-6-(isoxazol-5-yl)phenyl 3,5-dimethylphenylcarbamate 77% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.13-8.12 (m, 1H), 7.84(s, 1H), 7.59 (s, 1H), 7.36-7.34(m, 2H), 7.08 (s, 1H), 6.71-6.67 (m, 1H), 2.28 (s, 6H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{14}\text{Cl}_2\text{N}_2\text{O}_3$, 377.0453; found, 377.0457.

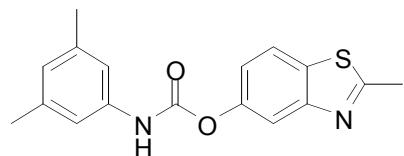


8: 4-chloro-2-isopropyl-5-methylphenyl 3,5-dimethylphenylcarbamate 72% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.26-7.25 (m, 1H), 7.09(s, 2H), 6.99 (s, 1H), 6.76

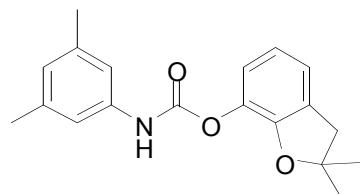
(s, 1H), 3.04 (m, 1H), 2.33 (s, 3H), 2.30 (s, 6H), 1.21 (d, J=7Hz, 6H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{22}\text{ClNO}_2$, 332.1411; found, 332.1415.



9: 4-fluoro-3-methylphenyl 3,5-dimethylphenylcarbamate 82% A ^1H -NMR (600 MHz, CDCl_3): δ 7.07(s, 2H), 7.09(s, 2H), 7.18-7.00 (m, 2H), 6.98-6.94 (m, 1H), 6.76 (s, 1H), 2.30 (s, 6H), 2.28 (s, 3H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{16}\text{FNO}_2$, 274.1237; found, 274.1235.

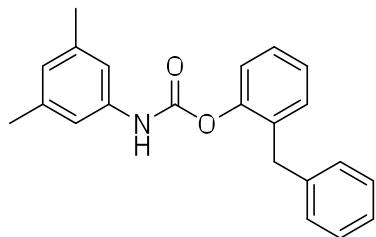


10: 2-methylbenzo[d]thiazol-5-yl 3,5-dimethylphenylcarbamate 73% A ^1H -NMR (600 MHz, CDCl_3): δ 7.80 (m, 2H), 7.28 (m, 1H), 7.12 (m, 2H), 6.80 (m, 1H), 4.89 (b, 1H), 2.86 (s, 3H), 2.32 (s, 6H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{16}\text{N}_2\text{O}_2\text{S}$, 313.1005; found, 313.1006.

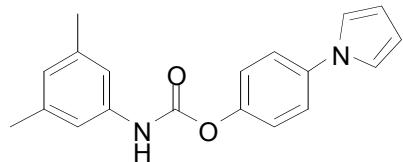


11: 2,2-dimethyl-2,3-dihydrobenzofuran-7-yl 3,5-dimethylphenylcarbamate 79% A ^1H -NMR (600 MHz, CDCl_3): δ 7.37 (m, 2H), 7.06 (m, 1H), 6.94 (m, 2H),

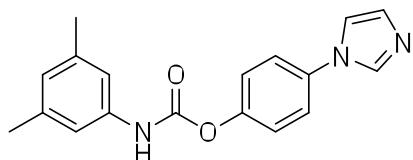
6.74 (m, 1H), 4.97 (b, 1H), 2.93 (s, 2H), 2.37 (s, 6H), 1.48 (s, 6H); **HRMS** (m/z): $[M+H]^+$ calculated for $C_{19}H_{21}NO_3$, 312.1594; found, 312.1599.



12: 2-benzylphenyl 3,5-dimethylphenylcarbamate 65% A 1H -NMR (600 MHz, $CDCl_3$): δ 7.26-7.24 (m, 3H), 7.17-7.16 (m, 5H), 7.02 (s, 2H), 6.75-6.73 (m, 2H), 3.97 (s, 2H), 2.28 (s, 6H); **HRMS** (m/z): $[M+H]^+$ calculated for $C_{22}H_{21}NO_2$, 332.1644; found, 332.1645.



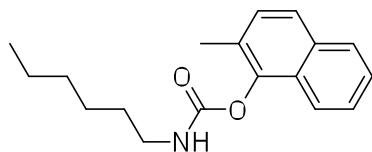
13: 4-(1H-pyrrol-1-yl)phenyl 3,5-dimethylphenylcarbamate 66% A 1H -NMR (600 MHz, $CDCl_3$): δ 7.38 (m, 2H), 7.23 (m, 2H), 7.07-7.03 (m, 4H), 6.74 (m, 1H), 6.34 (m, 2H), 5.01 (b, 1H), 2.29 (s, 6H); **HRMS** (m/z): $[M+H]^+$ calculated for $C_{19}H_{18}N_2O_2$, 307.1441; found, 307.1443.



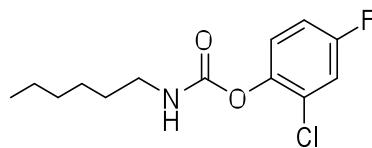
14: 4-(1H-imidazol-1-yl)phenyl 3,5-dimethylphenylcarbamate 69% A 1H -NMR (600 MHz, $CDCl_3$): δ 7.44 (s, 1H), 7.42-7.41 (m, 2H), 7.34-7.31 (m, 2H), 7.27-

7.26 (m, 2H), 7.21 (s, 1H), 7.09 (s, 2H), 2.32 (s, 6H). **HRMS** (m/z):

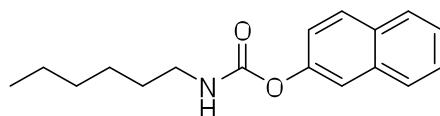
[M+H]⁺calculated for C₁₈H₁₇N₃O₂, 308.1393; found, 308.1395.



15: 2-methylnaphthalen-1-yl hexylcarbamate 67% *A* ¹H-NMR (600 MHz, CDCl₃): δ 7.82-7.79 (m, 2H), 7.65-7.62 (m, 1H), 7.47-7.41 (m, 2H), 7.33-7.31 (m, 1H), 5.26 (b, 1H), 3.33 (dd, 2H, *J* = 6.9 Hz, 13.2 Hz), 2.37 (s, 3H), 1.34-1.25 (m, 8H), 0.91 (t, *J*=7Hz, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₈H₂₃NO₂, 286.1801; found, 286.1804.

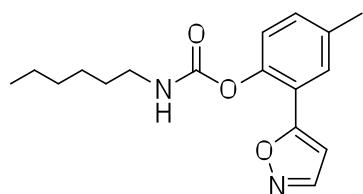


16: 2-chloro-4-fluorophenyl hexylcarbamate 69% *A* ¹H-NMR (600 MHz, CDCl₃): δ 7.24 (m, 2H), 6.98 (m, 1H), 5.16 (b, 1H), 3.27 (dd, 2H, *J* = 6.9 Hz, 13.2 Hz), 1.59-1.31 (m, 8H), 0.89 (t, 3H, *J* = 6.9 Hz). **HRMS** (m/z): [M+H]⁺calculated for C₁₃H₁₇CIFNO₂, 274.1005; found, 274.1009.

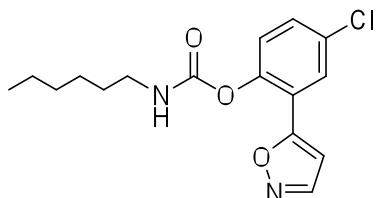


17: naphthalen-2-yl hexylcarbamate 74% *A* ¹H-NMR (600 MHz, CDCl₃): δ 7.74 (m, 3H), 7.57-7.24 (m, 4H), 5.11 (b, 1H), 3.26 (dd, 2H, *J* = 6.9 Hz, 13.2 Hz), 1.58-

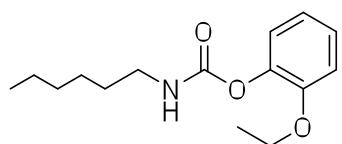
1.32 (m, 8H), 0.89 (t, 3H, *J* = 6.9 Hz). **HRMS** (m/z): [M+H]⁺calculated for C₁₇H₂₁NO₂, 272.1645; found, 272.1648.



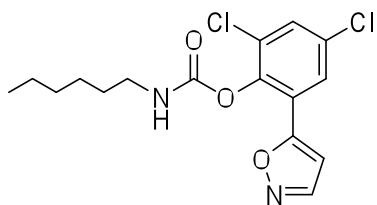
18: 2-(isoxazol-5-yl)-4-methylphenyl hexylcarbamate 76% A ¹H-NMR (600 MHz, CDCl₃): δ 8.28-8.27 (m, 1H), 7.73-7.72 (m, 1H), 7.25 (s, 1H), 7.14-7.12 (m, 1H), 6.52-6.51 (m, 1H), 5.22 (b, 1H), 3.27 (dd, 2H, *J* = 6.9 Hz, 13.2 Hz), 2.30 (s, 3H), 1.33-1.31 (m, 8H), 0.89 (t, *J*=7Hz, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₇H₂₂N₂O₃, 303.1702; found, 303.1704.



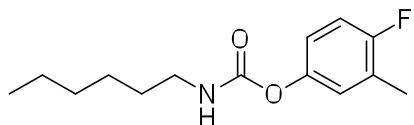
19 4-chloro-2-(isoxazol-5-yl)phenyl hexylcarbamate 80% A ¹H-NMR (600 MHz, CDCl₃): δ 8.31-8.30 (s, 1H), 7.91-7.90 (m, 1H), 7.42-7.39 (m, 1H), 7.23-7.21 (m, 1H), 6.57-6.56 (m, 1H), 5.25 (b, 1H), 3.28 (dd, *J* = 6.9 Hz, 13.2 Hz, 2H), 1.58-1.32 (m, 8H), 0.91 (t, *J*=7Hz, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₆H₁₉ClN₂O₃, 323.1156; found, 323.1157.



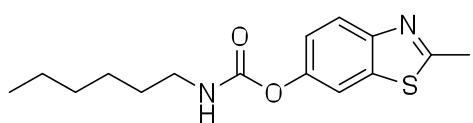
20: 2-ethoxyphenyl hexylcarbamate 69% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.08-7.06 (m, 2H), 6.97-6.95 (m, 2H), 5.04 (b, 1H), 4.09 (q, $J=7\text{Hz}$, 2H), 3.29 (dd, $J = 6.9 \text{ Hz}, 13.2 \text{ Hz}$, 2H), 1.41 (t, $J=7\text{Hz}$, 3H), 1.31-1.27 (m, 8H), 0.91 (t, $J=7\text{Hz}$, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{15}\text{H}_{23}\text{NO}_3$, 266.175; found, 266.1752.



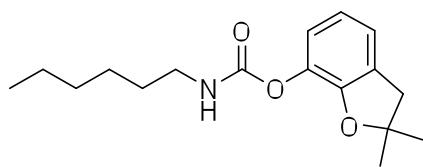
21 2,4-dichloro-6-(isoxazol-5-yl)phenyl hexylcarbamate 80% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.32-8.31 (m, 1H), 7.85-7.84 (m, 1H), 7.52-7.51(m, 1H), 6.60-6.58 (m, 1H), 5.32 (b, 1H), 3.31 (dd, $J = 7 \text{ Hz}, 13 \text{ Hz}$, 2H), 1.58-1.57 (m, 2H), 1.33-1.31(m, 6H), 0.90(t, $J=7\text{Hz}$, 3H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{18}\text{Cl}_2\text{N}_2\text{O}_3$, 357.0767; found, 357.0763.



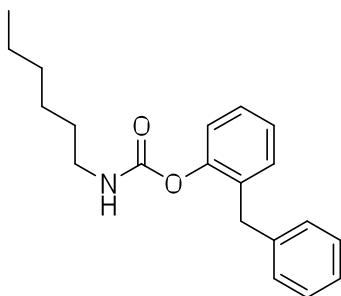
22 4-fluoro-3-methylphenyl hexylcarbamate 85% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 6.98-6.96 (m, 3H), 5.04 (b, 1H), 3.29 (dd, $J = 6.9 \text{ Hz}, 13.2 \text{ Hz}$, 2H), 2.27 (s, 3H), 1.56-1.34 (m, 8H), 0.92 (t, $J=7\text{Hz}$, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{20}\text{FNO}_2$, 254.155; found, 254.1557.



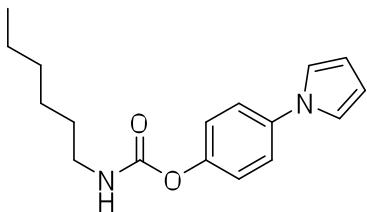
23: 2-methylbenzo[d]thiazol-6-yl hexylcarbamate 77% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.76-7.74 (m, 1H), 7.69-7.68 (m, 1H), 7.19-7.16 (m, 1H), 5.13 (b, 1H), 3.30 (dd, $J = 6.9$ Hz, 13.2 Hz, 2H), 2.29 (s, 3H), 1.60-1.56 (m, 2H), 1.33-1.31 (m, 6H), 0.92 (t, $J=7$ Hz, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{15}\text{H}_{20}\text{N}_2\text{O}_2\text{S}$, 293.1317; found, 293.1316.



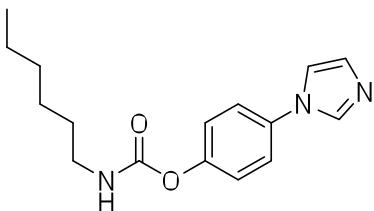
24: 2,2-dimethyl-2,3-dihydrobenzofuran-7-yl hexylcarbamate 75% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 6.99-6.97 (m, 1H), 6.83-6.81 (m, 1H), 6.77-6.75 (m, 1H), 3.28 (dd, $J = 6.9$ Hz, 13.2 Hz, 2H), 3.02 (s, 2H), 1.47-1.45 (m, 2H), 1.44 (s, 6H), 1.35-1.34 (m, 6H), 0.92 (t, $J=7$ Hz, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{25}\text{NO}_3$, 292.1906; found, 292.1904.



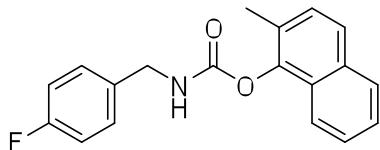
25: 2-benzylphenyl hexylcarbamate 78% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.32 (m, 1H), 7.26 (m, 4H), 7.21 (m, 4H), 5.91 (b, 1H), 4.19 (b, 1H), 3.94 (s, 2H), 3.24 (dd, 2H, $J = 6.8$ Hz, 13.4 Hz), 1.26-1.24 (m, 8H), 0.89 (t, 3H, $J = 6.9$ Hz); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{26}\text{N}_2\text{O}$, 311.2118; found, 311.2121.



26: 4-(1H-pyrrol-1-yl)phenyl hexylcarbamate 71% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.37-7.35 (m, 2H), 7.20-7.18 (m, 2H), 7.04 (s, 2H), 6.34 (s, 2H), 5.07 (b, 1H), 3.30 (dd, $J = 6.9$ Hz, 13.2 Hz, 2H), 1.62-1.56 (m, 2H), 1.34-1.32 (m, 6H), 0.93 (t, $J = 7$ Hz, 3H); . **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{22}\text{N}_2\text{O}_2$, 287.1753; found, 287.1758.

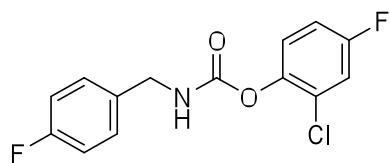


27: 4-(1H-imidazol-1-yl)phenyl hexylcarbamate 69% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.82 (s, 1H), 7.38-7.36 (m, 2H), 7.25-7.24 (m, 2H), 7.21 (s, 2H), 5.11 (b, 1H), 3.31 (dd, $J = 6.9$ Hz, 13.2 Hz, 2H), 1.60-1.58 (m, 2H), 1.34-1.32 (m, 6H), 0.91 (t, $J = 7$ Hz, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{21}\text{N}_3\text{O}_2$, 288.1706; found, 288.1708.

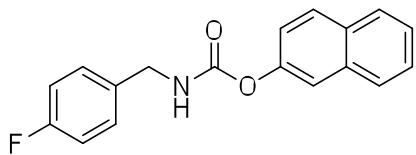


28: 2-methylnaphthalen-1-yl 4-fluorobenzylcarbamate 78% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.80 (m, 2H), 7.51 (m, 3H), 7.36 (m, 3H), 7.04 (m, 2H), 5.62 (b,

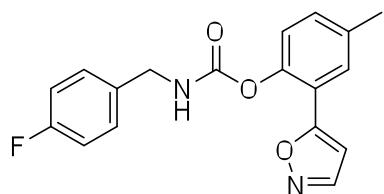
1H), 4.44 (d, 2H, J = 6.1 Hz), 2.35 (s, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₉H₁₆FNO₂, 310.1238; found, 310.1238.



29: 2-chloro-4-fluorophenyl 4-fluorobenzylcarbamate 79% A ¹H-NMR (600 MHz, CDCl₃): δ 7.35-7.16 (m, 4H), 7.03 (m, 3H), 5.51 (b, 1H), 4.42 (d, 2H, J = 6.1 Hz). **HRMS** (m/z): [M+H]⁺calculated for C₁₄H₁₀ClF₂NO₂, 298.0441; found, 298.0437.



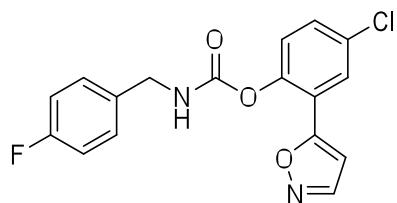
30: naphthalen-2-yl 4-fluorobenzylcarbamate 77% A ¹H-NMR (600 MHz, CDCl₃): δ 7.84 (m, 3H), 7.61-7.47 (m, 6H), 7.08-7.04 (m, 2H), 5.45 (b, 1H), 4.44 (d, 2H, J = 6.1 Hz). **HRMS** (m/z): [M+H]⁺calculated for C₁₈H₁₄FNO₂, 296.1082; found, 296.1085.



31: 2-(isoxazol-5-yl)-4-methylphenyl 4-fluorobenzylcarbamate 72% A ¹H-NMR (600 MHz, CDCl₃): δ 8.24 (m, 1H), 7.70 (m, 1H), 7.31-7.14 (m, 6H), 6.47

(m, 1H), 5.61 (b, 1H), 4.40 (d, 2H, J = 6.1 Hz), 2.39 (s, 3H). **HRMS** (m/z):

$[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{15}\text{FN}_2\text{O}_3$, 327.1140; found, 327.1142.

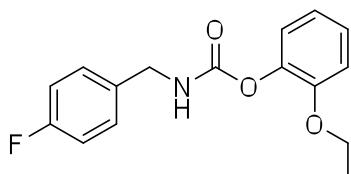


32: 4-chloro-2-(isoxazol-5-yl)phenyl 4-fluorobenzylcarbamate 68% A ^1H -

NMR (600 MHz, CDCl_3): δ 8.28 (m, 1H), 7.88 (m, 1H), 7.41-7.06 (m, 6H), 6.52

(m, 1H), 5.57 (b, 1H), 4.42 (d, 2H, J = 6.1 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for

$\text{C}_{17}\text{H}_{12}\text{ClFN}_2\text{O}_3$, 347.0593; found, 347.0599.

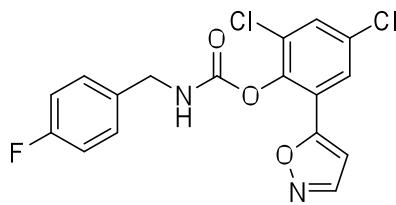


33: 2-ethoxyphenyl 4-fluorobenzylcarbamate 71% A ^1H -NMR (600 MHz,

CDCl_3): δ 7.32 (m, 2H), 7.05-6.92 (m, 6H), 5.45 (b, 1H), 4.41 (d, 2H, J = 6.1 Hz),

4.05 (q, 2H, J = 6.9 Hz), 1.37 (t, 3H, J = 6.9 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated

for $\text{C}_{16}\text{H}_{16}\text{FNO}_3$, 290.1187; found, 290.1184.

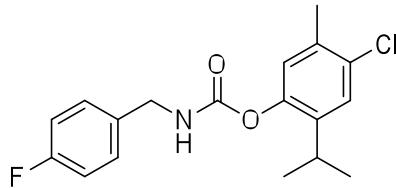


34: 2,4-dichloro-6-(isoxazol-5-yl)phenyl 4-fluorobenzylcarbamate 65% A ^1H -

NMR (600 MHz, CDCl_3): δ 8.42 (m, 1H), 7.85 (m, 1H), 7.63 (m, 1H), 7.39-7.12

(m, 4H), 6.73 (m, 1H), 5.37 (b, 1H), 4.27 (d, 2H, $J = 6.1$ Hz). **HRMS** (m/z):

$[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{11}\text{Cl}_2\text{FN}_2\text{O}_3$, 381.0204; found, 381.0202.



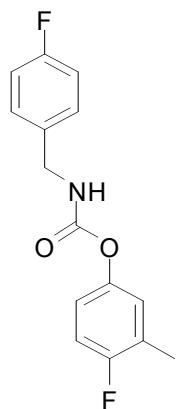
35: 4-chloro-2-isopropyl-5-methylphenyl 4-fluorobenzylcarbamate 67% A

$^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.31-7.29 (m, 2H), 7.23 (s, 1H), 7.07-7.02 (m, 2H),

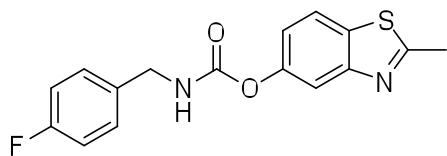
6.95 (s, 1H), 5.40 (b, 1H), 4.42 (d, $J=6\text{Hz}$, 2H), 3.04 (m, 1H), 2.31 (s, 3H), 1.19

(d, $J=6\text{Hz}$, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{19}\text{ClFNO}_2$, 336.116;

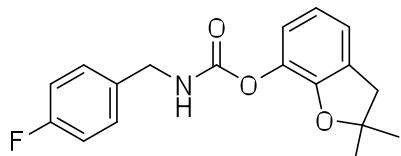
found, 336.1164.



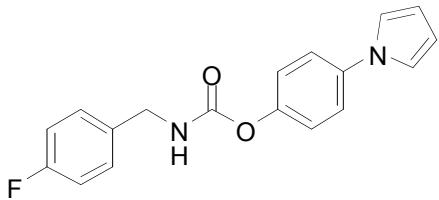
36: 4-fluoro-3-methylphenyl 4-fluorobenzylcarbamate 80% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.30 (m, 2H), 7.07-6.95 (m, 5H), 5.36 (b, 1H), 4.39 (d, 2H, J = 6.1 Hz), 2.26 (d, 3H, J = 1.9 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{15}\text{H}_{13}\text{F}_2\text{NO}_2$, 278.0987; found, 278.0984.



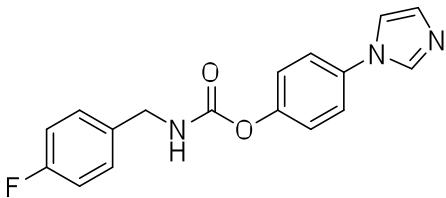
37: 2-methylbenzo[d]thiazol-5-yl 4-fluorobenzylcarbamate 75% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.72 (m, 2H), 7.34-7.04 (m, 5H), 5.58 (b, 1H), 4.42 (d, 2H, J = 6.1 Hz), 2.82 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{13}\text{FN}_2\text{O}_2\text{S}$, 317.0755; found, 317.0758.



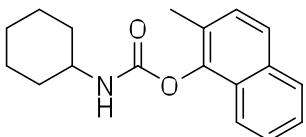
38: 2,2-dimethyl-2,3-dihydrobenzofuran-7-yl 4-fluorobenzylcarbamate 70% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.31-7.28 (m, 2H), 7.03-6.99(m, 4H), 6.79-6.77 (m, 1H), 5.41 (b, 1H), 4.41 (d, 2H, J = 6.1 Hz), 3.04 (s, 2H), 1.49 (s, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{18}\text{FNO}_3$, 316.1344; found, 316.1346.



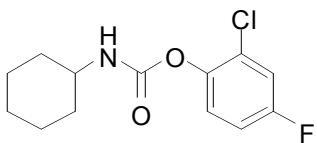
39: 4-(1H-pyrrol-1-yl)phenyl 4-fluorobenzylcarbamate 69% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.36-7.34 (m, 4H), 7.21 (m, 2H), 7.03-7.01(m, 4H), 6.18 (m, 2H), 5.39 (b, 1H), 4.40 (d, 2H, $J = 6.0$ Hz); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{15}\text{FN}_2\text{O}_2$, 311.1191; found, 311.1196.



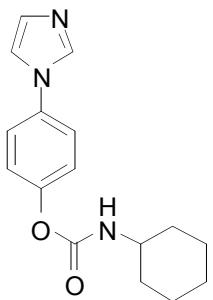
40: 4-(1H-imidazol-1-yl)phenyl 4-fluorobenzylcarbamate 58% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.78 (m, 1H), 7.39-7.20 (m, 8H), 7.06 (m, 2H), 5.57 (b, 1H), 4.43 (d, 2H, $J = 6.1$ Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{14}\text{FN}_3\text{O}_2$, 312.1143; found, 312.1146.



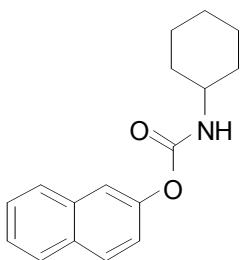
41: 2-methylnaphthalen-1-yl cyclohexylcarbamate 74% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.85 (m, 2H), 7.82 (m, 1H), 7.50 (m, 3H), 5.12 (b, 1H), 3.63 (m, 1H), 2.29 (s, 3H), 2.09 (m, 2H), 1.79 (m, 2H), 1.42-1.24 (m, 6H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{21}\text{NO}_2$, 284.1645; found, 284.1647.



42: 2-chloro-4-fluorophenyl cyclohexylcarbamate 69% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.17 (m, 2H), 6.98 (m, 1H), 5.01 (b, 1H), 3.59 (m, 1H), 2.04 (m, 2H), 1.75 (m, 2H), 1.23-1.18 (m, 6H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{15}\text{ClFNO}_2$, 272.0848; found, 272.0851.

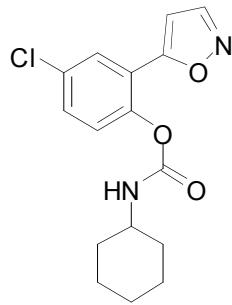


43: 4-(1H-imidazol-1-yl)phenyl cyclohexylcarbamate 61% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.80 (m, 3H), 7.58 (m, 1H), 7.44 (m, 2H), 7.03 (m, 1H), 5.01 (b, 1H), 3.58 (m, 1H), 2.03-1.71 (m, 4H), 1.38-1.20 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{19}\text{N}_3\text{O}_2$, 286.1550; found, 286.1553.



44: naphthalen-2-yl cyclohexylcarbamate 77% A $^1\text{H-NMR}$ (600 MHz, CDCl_3):

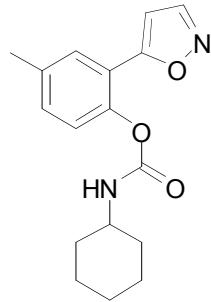
δ 7.77 (m, 3H), 7.58-7.43 (m, 4H), 5.00 (b, 1H), 3.58 (m, 1H), 2.03-1.71 (m, 4H), 1.38-1.19 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{19}\text{NO}_2$, 270.1489; found, 270.1482.



45: 4-chloro-2-(isoxazol-5-yl)phenyl cyclohexylcarbamate 70% A $^1\text{H-NMR}$

(600 MHz, CDCl_3): δ 8.32 (m, 1H), 7.91(m, 1H), 7.41(m, 1H), 7.21(m, 1H), 6.56(m, 1H), 5.10 (b, 1H), 3.54 (m, 1H), 2.03-1.99 (m, 4H), 1.36-1.23 (m, 6H).

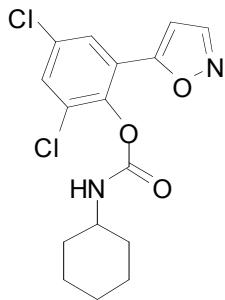
HRMS (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{17}\text{ClN}_2\text{O}_3$, 321.1001; found, 321.1007.



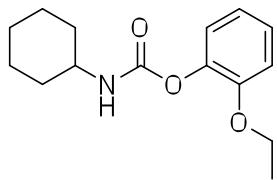
46: 2-(isoxazol-5-yl)-4-methylphenyl cyclohexylcarbamate 70% A $^1\text{H-NMR}$

(600 MHz, CDCl_3): δ 8.28 (m, 1H), 7.71 (m, 1H), 7.12 (m, 2H), 6.50 (m, 1H), 5.10 (b, 1H), 3.54 (m, 1H), 2.39 (s, 3H), 2.00 (m, 2H), 1.73 (m, 2H), 1.37-1.21 (m, 6H).

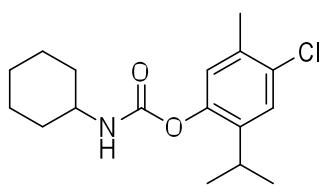
HRMS (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{20}\text{N}_2\text{O}_3$, 301.1547; found, 301.1544.



47: 2,4-dichloro-6-(isoxazol-5-yl)phenyl cyclohexylcarbamate 63% A ^1H -NMR (600 MHz, CDCl_3): δ 8.32 (m, 1H), 7.84 (m, 1H), 7.50 (m, 1H), 6.58 (m, 1H), 5.21 (b, 1H), 3.35 (m, 1H), 2.03-1.60 (m, 4H), 1.24-1.10 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{16}\text{Cl}_2\text{N}_2\text{O}_3$, 355.0611; found, 355.0614.

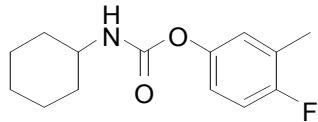


48: 2-ethoxyphenyl cyclohexylcarbamate 66% A ^1H -NMR (600 MHz, CDCl_3): δ 7.07-7.05 (m, 2H), 6.93-6.89 (m, 2H), 4.98 (b, 1H), 4.04 (q, $J=7\text{Hz}$, 2H), 3.47-3.46 (m, 1H), 2.00-1.97 (m, 2H), 1.74-1.69 (m, 3H), 1.61-1.56 (m, 2H), 1.42 (t, $J=7\text{Hz}$, 3H), 1.37-1.31 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{15}\text{H}_{21}\text{NO}_3$, 264.1593; found, 264.1597.

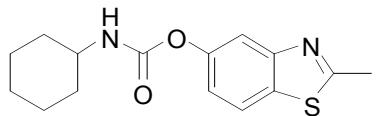


49: 4-chloro-2-isopropyl-5-methylphenyl cyclohexylcarbamate 63% A ^1H -NMR (600 MHz, CDCl_3): δ 7.23 (s, 1H), 6.94 (s, 1H), 4.94 (b, 1H), 3.56-3.54 (m, 1H), 3.06-2.99 (m, 1H), 2.30 (s, 3H), 2.03-1.99 (m, 2H), 1.73-1.72 (m, 2H), 1.65-

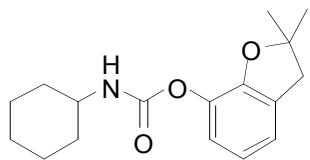
1.63 (m, 2H), 1.39-1.36 (m, 2H), 1.21-1.19 (m, 2H), 1.18 (d, $J=7$ Hz, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{24}\text{ClNO}_2$, 310.1568; found, 310.1566.



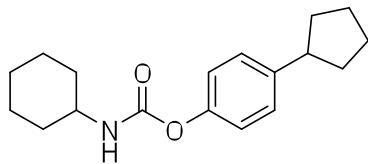
50: *4-fluoro-3-methylphenyl cyclohexylcarbamate* 77% **A** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 6.92 (m, 3H), 4.89 (b, 1H), 3.55 (m, 1H), 2.25 (s, 3H), 2.00 (m, 2H), 1.70 (m, 2H), 1.39-1.23 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{18}\text{FNO}_2$, 252.1395; found, 252.1399.



51: *2-methylbenzo[d]thiazol-5-yl cyclohexylcarbamate* 79% **A** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.37 (m, 2H), 7.15 (m, 1H), 5.01 (b, 1H), 3.56 (m, 1H), 2.80 (s, 3H), 2.00 (m, 2H), 1.71 (m, 2H), 1.36-1.18 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{15}\text{H}_{18}\text{N}_2\text{O}_2\text{S}$, 291.1162; found, 291.1163.

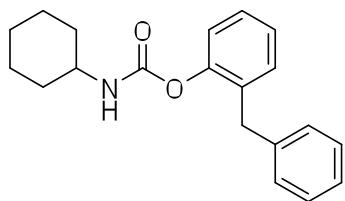


52: *2,2-dimethyl-2,3-dihydrobenzofuran-7-yl cyclohexylcarbamate* 69% **A** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 6.94-6.92 (m, 2H), 6.77-6.73 (m, 1H), 4.97 (b, 1H), 3.54 (m, 1H), 3.01(s, 2H), 2.01-1.98 (m, 2H), 1.72-1.68 (m, 2H), 1.59-1.57 (m, 2H), 1.47 (s, 6H), 1.36-1.31 (m, 2H), 1.20-1.18 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{23}\text{NO}_3$, 290.1751; found, 290.1757.

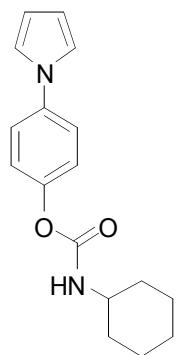


53: 4-cyclopentylphenyl cyclohexylcarbamate 61% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.21-7.19 (m, 2H), 7.03-7.01 (m, 2H), 4.92 (b, 1H), 3.56-3.54 (m, 1H), 2.99-2.94 (m, 1H), 2.04-2.01 (m, 4H), 1.80-1.67 (m, 10H), 1.39-1.08 (m, 4H).

HRMS (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{25}\text{NO}_2$, 288.1957; found, 288.1959.

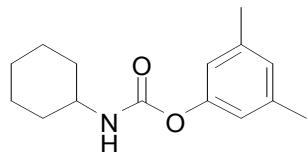


54: 2-benzylphenyl cyclohexylcarbamate 64% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.25-7.23 (m, 3H), 7.16-7.11 (m, 6H), 4.83 (b, 1H), 3.92 (s, 2H), 3.51-3.49 (m, 1H), 2.02-1.93 (m, 2H), 1.72-1.68 (m, 2H), 1.20-1.13 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{21}\text{NO}_3$, 312.1593; found, 312.1596.

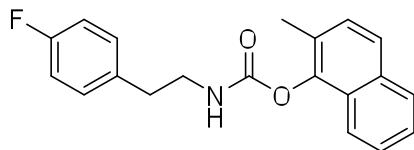


55: 4-(1H-pyrrol-1-yl)phenyl cyclohexylcarbamate 65% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.34 (m, 2H), 7.21 (m, 2H), 7.02 (s, 2H), 6.32 (s, 2H), 4.95(b, 1H), 3.55

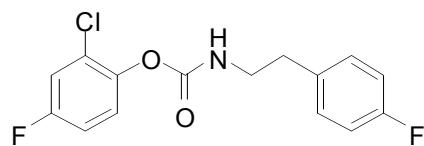
(m, 1H), 2.01-1.71 (m, 4H), 1.35-1.19 (m, 6H). **HRMS** (m/z): [M+H]⁺calculated for C₁₇H₂₀N₂O₂, 285.1598; found, 285.1596.



56: 3,5-dimethylphenyl cyclohexylcarbamate 79% A ¹H-NMR (600 MHz, CDCl₃): δ 6.81 (s, 1H), 6.73 (s, 2H), 4.88 (b, 1H), 3.55 (m, 1H), 2.29 (s, 6H), 2.01 (m, 2H), 1.72 (m, 2H), 1.37-1.19 (m, 6H); **HRMS** (m/z): [M+H]⁺calculated for C₁₅H₂₁NO₂, 248.1645; found, 248.1646.

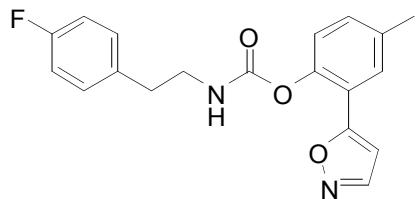


57: 2-methylnaphthalen-1-yl 4-fluorophenethylcarbamate 69% A ¹H-NMR (600 MHz, CDCl₃): δ 8.21-8.19 (m, 1H), 8.12-8.10 (m, 1H), 7.68-7.53 (m, 3H), 7.26-7.21 (m, 4H), 6.95-6.93 (m, 1H), 5.16 (b, 1H), 3.57 (q, J=7Hz, 2H), 2.90 (t, J=7Hz, 2H), 2.33 (s, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₀H₁₈FNO₂, 324.1394; found, 324.1398.



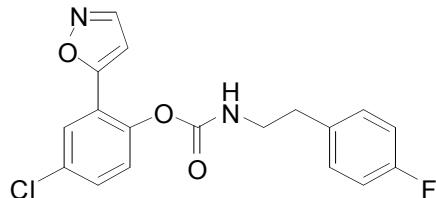
58: 2-chloro-4-fluorophenyl 4-fluorophenethylcarbamate 77% A ^1H -NMR

(600 MHz, CDCl_3): δ 7.21-7.12 (m, 4H), 7.02 (m, 3H), 5.19 (b, 1H), 3.51 (dd, 2H, J = 6.9 Hz, 13.1 Hz), 2.87 (t, 2H, J = 6.9 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{15}\text{H}_{12}\text{ClFNO}_2$, 312.0598; found, 312.0593.



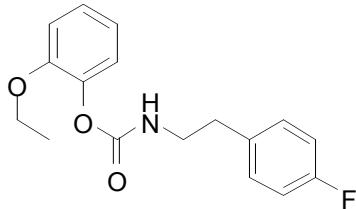
59: 2-(isoxazol-5-yl)-4-methylphenyl 4-fluorophenethylcarbamate 65% A ^1H -

NMR (600 MHz, CDCl_3): δ 8.23 (m, 1H), 7.69 (m, 1H), 7.23-6.99 (m, 6H), 6.37 (m, 1H), 5.21 (b, 1H), 3.49 (q, 2H, J = 6.9 Hz), 2.84 (t, 2H, J = 6.9 Hz), 2.37 (s, 3H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{17}\text{FN}_2\text{O}_3$, 341.1296; found, 341.1299.

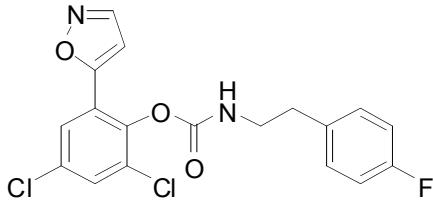


60: 4-chloro-2-(isoxazol-5-yl)phenyl 4-fluorophenethylcarbamate 78% A ^1H -

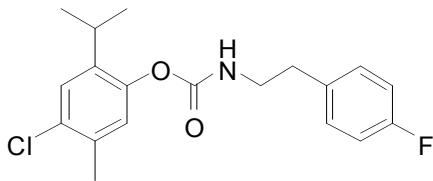
NMR (600 MHz, CDCl_3): δ 8.28 (m, 1H), 7.88 (m, 1H), 7.40 (m, 1H), 7.18-7.02 (m, 5H), 6.43 (m, 1H), 5.25 (b, 1H), 3.52 (dd, 2H, J = 6.9 Hz, 13.1 Hz), 2.87 (t, 2H, J = 6.9 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{14}\text{ClFN}_2\text{O}_3$, 361.0750; found, 361.0749.



61: 2-ethoxyphenyl 4-fluorophenethylcarbamate 72% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.20-6.93 (m, 8H), 5.12 (b, 1H), 4.07 (q, 2H, J = 6.9 Hz), 3.49 (dd, 2H, J = 6.9 Hz, 13.1 Hz), 2.86 (t, 2H, J = 6.9 Hz), 1.40 (t, 3H, J = 6.9 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{18}\text{FNO}_3$, 304.1344; found, 304.1348.

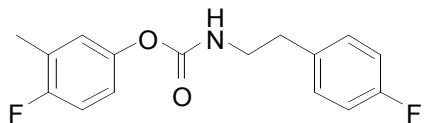


62: 2,4-dichloro-6-(isoxazol-5-yl)phenyl 4-fluorophenethylcarbamate 71% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.28 (m, 1H), 7.83 (m, 1H), 7.52 (m, 1H), 7.21-6.97 (m, 4H), 6.45 (m, 1H), 5.38 (b, 1H), 3.55 (dd, 2H, J = 6.9 Hz, 13.1 Hz), 2.87 (t, 2H, J = 6.9 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{13}\text{Cl}_2\text{FN}_2\text{O}_3$, 395.0360; found, 395.0359.

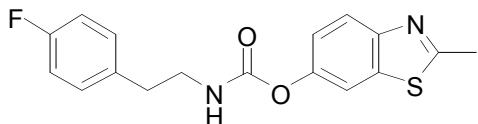


63: 4-chloro-2-isopropyl-5-methylphenyl 4-fluorophenethylcarbamate 75% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.25-7.16 (m, 4H), 7.01 (m, 2H), 5.06 (b, 1H), 3.07 (m, 1H), 2.96 (dd, 2H, J = 6.9 Hz, 13.1 Hz), 2.85 (t, 2H, J = 6.9 Hz), 2.30 (s,

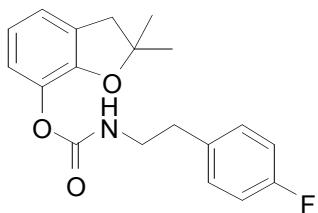
3H), 1.15 (d, 6H, J = 6.9 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{21}\text{ClFNO}_2$, 350.1318; found, 350.1311.



64: 4-fluoro-3-methylphenyl 4-fluorophenethylcarbamate 81% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.18 (m, 2H), 7.01-6.85 (m, 5H), 5.02 (b, 1H), 4.75 (dd, 2H, J = 6.9 Hz, 13.1 Hz), 2.86 (t, 2H, J = 6.9 Hz), 2.25 (d, 3H, J = 2.0 Hz). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{15}\text{F}_2\text{NO}_2$, 292.1144; found, 292.1147.

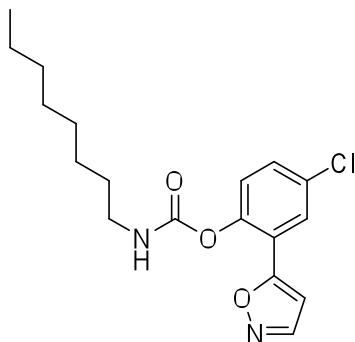


65: 2-methylbenzo[d]thiazol-6-yl 4-fluorophenethylcarbamate 73% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.70 (m, 2H), 7.20 (m, 3H), 7.00 (m, 2H), 5.15 (b, 1H), 3.49 (q, 2H, J = 6.9 Hz), 2.85 (t, 2H, J = 6.9 Hz), 2.71 (s, 3H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{15}\text{FN}_2\text{O}_2\text{S}$, 331.0911; found, 331.0912.

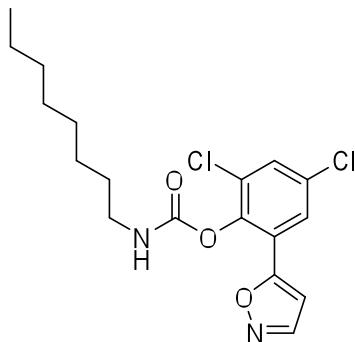


66: 2,2-dimethyl-2,3-dihydrobenzofuran-7-yl 4-fluorophenethylcarbamate 69% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.20 (m, 2H), 7.03-6.92 (m, 4H), 6.80 (m, 1H), 5.10 (b, 1H), 3.48 (dd, 2H, J = 6.9 Hz, 13.1 Hz), 3.04 (s, 2H), 2.86 (t, 2H, J =

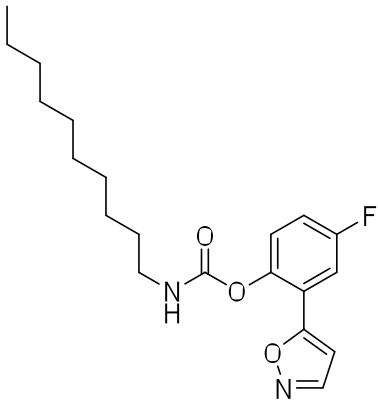
6.9 Hz), 1.50 (s, 6H). **HRMS** (m/z): [M+H]⁺calculated for C₁₉H₂₀FNO₃, 330.1500; found, 330.1503.



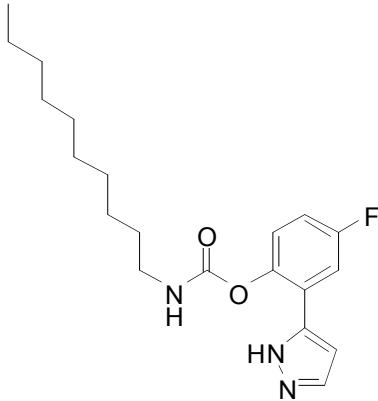
67: 4-chloro-2-(isoxazol-5-yl)phenyl octylcarbamate 78% A ¹H-NMR (600 MHz, CDCl₃): δ 8.31-8.30 (m, 1H), 7.91-7.89 (m, 1H), 7.42-7.39 (m, 1H), 7.23-7.21 (m, 1H), 6.56-6.55 (m, 1H), 5.19-5.16 (b, 1H), 3.30 (dd, J = 7 Hz, 13 Hz, 2H), 1.30-1.28 (m, 12H), 0.89 (t, J=7Hz, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₈H₂₃ClN₂O₃, 351.1469; found, 351.1467.



68: 2,4-dichloro-6-(isoxazol-5-yl)phenyl octylcarbamate 76% A ¹H-NMR (600 MHz, CDCl₃): δ 8.32-8.31 (m, 1H), 7.85-7.84 (m, 1H), 7.52-7.51 (m, 1H), 6.59-6.58 (m, 1H), 5.31 (b, 1H), 3.32 (dd, J = 7 Hz, 13 Hz, 2H), 1.29-1.25 (m, 14H), 0.89 (t, J=7Hz, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₈H₂₂Cl₂N₂O₃, 385.1079; found, 385.1078.

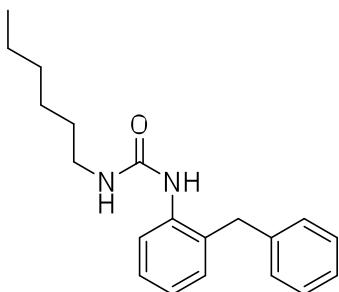


69: 4-fluoro-2-(isoxazol-5-yl)phenyl decylcarbamate 79% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.31-8.30 (m, 1H), 7.64-7.61 (m, 1H), 7.24-7.21 (m, 1H), 7.16-7.12 (m, 1H), 6.57-6.56 (m, 1H), 5.20 (b, 1H), 3.30 (dd, $J = 7$ Hz, 13 Hz, 2H), 1.59-1.58 (m, 2H), 1.29-1.25 (m, 14H), 0.89 (t, $J=7$ Hz, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{27}\text{FN}_2\text{O}_3$, 363.2078; found, 363.2074.

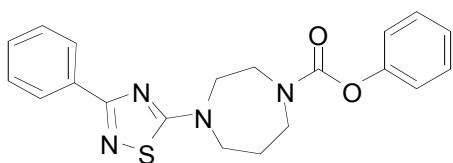


70: 4-fluoro-2-(1H-pyrazol-5-yl)phenyl decylcarbamate 76% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 9.58 (s, 1H), 8.33-8.32 (m, 1H), 7.28-7.25 (m, 1H), 7.00-6.98 (m, 1H), 6.81(b, 1H), 6.74-6.73 (m, 1H), 3.47(dd, $J = 7$ Hz, 13Hz, 2H), 1.58-1.57 (m,

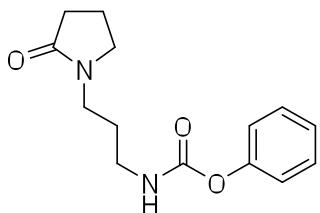
4H), 1.27-1.26 (m, 12H), 0.89 (t, 3H, $J = 7$ Hz); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{28}\text{FN}_3\text{O}_2$, 362.2239; found, 362.2235.



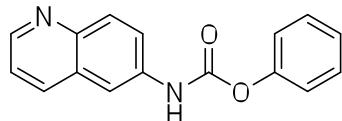
71: 1-(2-benzylphenyl)-3-hexylurea 89% A $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.33-7.31 (m, 1H), 7.27-7.21 (m, 5H), 7.09-7.05 (m, 3H), 5.81 (b, 1H), 4.19 (b, 1H), 3.99 (s, 2H), 3.10 (dd, $J = 7$ Hz, 13Hz, 2H), 1.39-1.37 (m, 2H), 1.25-1.24 (m, 6H), 0.87 (t, $J=7$ Hz, 3H); **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{26}\text{N}_2\text{O}$, 311.2117; found, 311.2115.



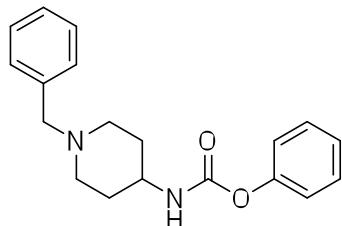
72: phenyl 4-(3-phenyl-1,2,4-thiadiazol-5-yl)-1,4-diazepane-1-carboxylate 80% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.22 (m, 2H), 7.38 (m, 3H), 7.24 (m, 3H), 7.15 (m, 2H), 3.93-3.82 (m, 6H), 3.64 (m, 2H), 2.18 (m, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{20}\text{N}_4\text{O}_2\text{S}$, 381.1380; found, 381.1379.



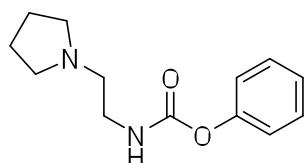
73: phenyl 3-(2-oxopyrrolidin-1-yl)propylcarbamate 75% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.46-7.43 (m, 2H), 7.31-7.27 (m, 3H), 4.96 (b, 1H), 3.32 (t, $J=7\text{Hz}$, 2H), 3.22-3.18 (m, 4H), 2.35 (t, $J=7\text{Hz}$, 2H), 2.01-1.94 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{18}\text{N}_2\text{O}_3$, 263.1389; found, 263.1387.



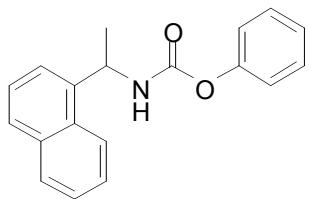
74: phenyl quinolin-6-ylcarbamate 77% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.87-8.85 (m, 1H), 8.63-8.61 (m, 1H), 8.17-8.15 (m, 1H), 7.82-7.80 (m, 1H), 7.51-7.45 (m, 6H), 6.76 (s, 1H), 5.21 (b, 1H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{12}\text{N}_2\text{O}_2$, 265.0971; found, 265.0974.



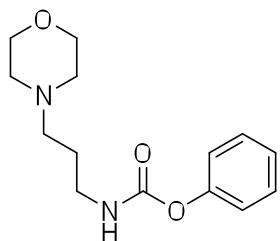
76: phenyl 1-benzylpiperidin-4-ylcarbamate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.41-7.23 (m, 10H), 3.70 (s, 2H), 3.61 (m, 1H), 2.54-2.47 (m, 4H), 1.92-1.89 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{22}\text{N}_2\text{O}_2$, 311.1753; found, 311.1753.



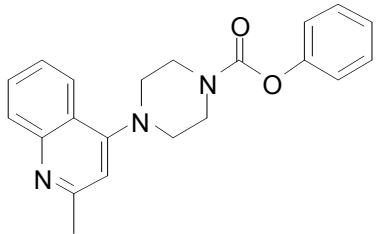
77: phenyl 2-(pyrrolidin-1-yl)ethylcarbamate 78% **B** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.39-7.36 (m, 2H), 7.28-7.25 (m, 3H), 4.96 (b, 1H), 3.27 (dd, $J=7\text{Hz}$, 13Hz, 2H), 2.51-2.47 (m, 6H), 1.65 (t, $J=7\text{Hz}$, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{18}\text{N}_2\text{O}_2$, 235.144; found, 235.1442.



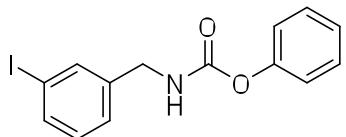
78: phenyl 1-(naphthalen-1-yl)ethylcarbamate 76% **B** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.63 (m, 2H), 7.55-7.29 (m, 8H), 7.19 (m, 2H), 5.24 (b, 1H), 4.89 (dd, 1H, $J = 13.4\text{ Hz}$, 6.6 Hz), 1.58 (d, 3H, $J = 6.6\text{ Hz}$). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{17}\text{NO}_2$, 292.1332; found, 292.1329.



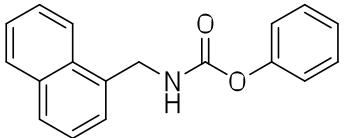
79: phenyl 3-morpholinopropylcarbamate 79% **B** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.41-7.39 (m, 2H), 7.29-7.26 (m, 3H), 3.86 (t, $J=7\text{Hz}$, 4H), 3.27 (dd, $J=7\text{ Hz}$, 13 Hz, 2H), 2.49-2.38 (m, 6H), 1.61-1.58 (m, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{20}\text{N}_2\text{O}_3$, 265.1546; found, 265.1548.



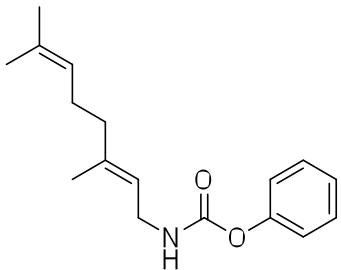
80: phenyl 4-(2-methylquinolin-4-yl)piperazine-1-carboxylate 70% B ^1H -NMR (600 MHz, CDCl_3): δ 8.02-8.00 (m, 2H), 7.66-7.65 (m, 1H), 7.42-7.39 (m, 3H), 7.22-7.16 (m, 3H), 6.79 (s, 1H), 4.05-3.98 (m, 4H), 3.27-3.25 (m, 4H), 2.71 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{21}\text{N}_3\text{O}_2$, 348.1707; found, 348.1705.



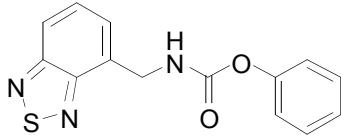
82: phenyl 3-iodobenzylcarbamate 76% B ^1H -NMR (600 MHz, CDCl_3): δ 7.68 (s, 1H), 7.58-7.57 (m, 1H), 7.42-7.40 (m, 2H), 7.27-7.23 (m, 4H), 6.98-6.97 (m, 1H), 5.11 (b, 1H), 4.25 (s, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{12}\text{INO}_2$, 353.9985; found, 353.9988.



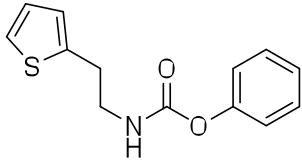
83: phenyl naphthalen-1-ylmethylcarbamate 83% B ^1H -NMR (600 MHz, CDCl_3): δ 8.19-8.17 (m, 1H), 8.04-8.03 (m, 1H), 7.53-7.45 (m, 5H), 7.28-7.26 (m, 3H), 7.01-6.99 (m, 1H), 5.19 (b, 1H), 4.65 (s, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{15}\text{NO}_2$, 278.1175; found, 278.1177.



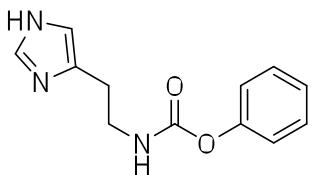
84: (E)-phenyl 3,7-dimethylocta-2,6-dienylcarbamate 87% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.41-7.39 (m, 2H), 7.28-7.25 (m, 3H), 5.34-5.32 (m, 1H), 5.20-5.18 (m, 1H), 5.15 (b, 1H), 4.06 (d, $J=6\text{Hz}$, 2H), 2.01-1.98 (m, 4H), 1.81-1.79 (m, 2H), 1.69-1.67 (m, 1H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{23}\text{NO}_2$, 274.1801; found, 274.1808.



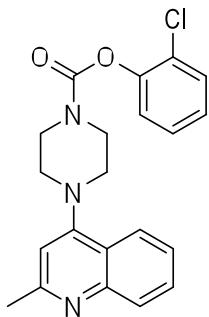
85: phenyl benzo[c][1,2,5]thiadiazol-4-ylmethylcarbamate 78% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.95 (m, 1H), 7.79 (m, 1H), 7.43 (m, 3H), 7.28 (m, 3H), 5.19 (b, 1H), 4.29 (s, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{11}\text{N}_3\text{O}_2\text{S}$, 286.0645; found, 286.0643.



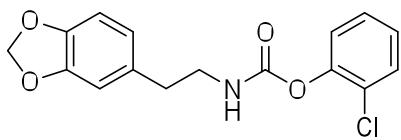
86: phenyl 2-(thiophen-2-yl)ethylcarbamate 82% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.39-7.36 (m, 3H), 7.27-7.25 (m, 3H), 6.92-6.90 (m, 1H), 6.83-6.81 (m, 1H), 5.17 (b, 1H), 3.35 (dd, $J = 7\text{ Hz}, 13\text{ Hz}$, 2H), 2.77 (t, $J=7\text{Hz}$, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{13}\text{NO}_2\text{S}$, 248.0739; found, 248.0735.



87: phenyl 2-(1H-imidazol-4-yl)ethylcarbamate 85% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.76 (s, 1H), 7.62 (s, 1H), 7.41-7.39 (m, 2H), 7.28-7.25 (m, 3H), 5.21 (b, 1H), 3.39 (dd, $J = 7$ Hz, 13 Hz, 2H), 2.82 (t, $J=7$ Hz, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{12}\text{H}_{13}\text{N}_3\text{O}_2$, 232.108; found, 232.1082.



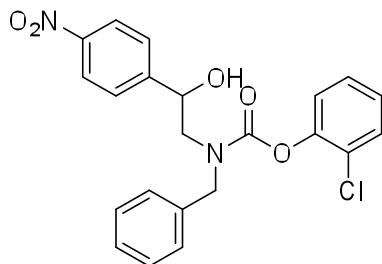
88: 2-chlorophenyl 4-(2-methylquinolin-4-yl)piperazine-1-carboxylate 77% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.10-8.07 (m, 1H), 8.00-7.98 (m, 1H), 7.75-7.73(m, 1H), 7.43-7.40 (m, 2H), 7.25-7.19 (m, 3H), 6.70(s, 1H), 4.00-3.94 (m, 4H), 3.21-3.17 (m, 4H), 2.61 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{20}\text{ClN}_3\text{O}_2$, 382.1316; found, 382.1317.



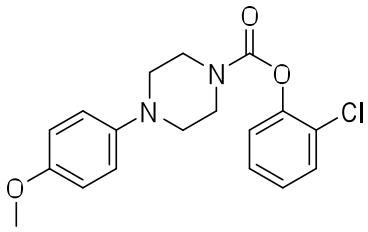
90: 2-chlorophenyl 2-(benzo[d][1,3]dioxol-5-yl)ethylcarbamate 84% **B** ^1H -NMR (600 MHz, CDCl₃): δ 7.45-7.43 (m, 1H), 7.29-7.22 (m, 3H), 6.81-6.75 (m, 3H), 5.92 (s, 2H), 5.17 (b, 1H), 3.32 (dd, $J = 7$ Hz, 13 Hz, 2H), 2.97 (t, $J=7$ Hz, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for C₁₆H₁₄CINO₄, 320.0683; found, 320.0685.



92: 2-chlorophenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 87% **B** ^1H -NMR (600 MHz, CDCl₃): δ 8.73-8.71 (m, 2H), 7.95-7.93 (m, 2H), 7.76-7.74 (m, 1H), 7.45-7.21 (m, 7H), 4.71-4.61 (m, 2H), 3.05-3.02 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for C₂₀H₁₇CIN₂O₂, 353.1051; found, 353.1054.



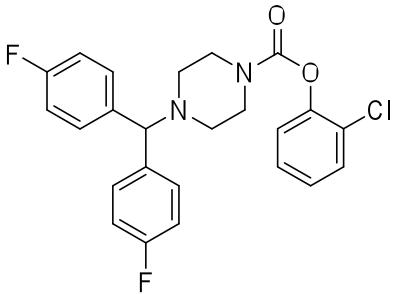
93: 2-chlorophenyl benzyl(2-hydroxy-2-(4-nitrophenyl)ethyl)carbamate 65% **B** ^1H -NMR (600 MHz, CDCl₃): δ 8.22 (d, $J=9$ Hz, 2H), 7.59 (d, $J=9$ Hz, 2H), 7.46-7.43 (m, 1H), 7.36-7.22 (m, 8H), 5.19 (t, $J=7$ Hz, 1H), 4.06 (s, 2H), 3.56-3.52(m, 1H), 3.34-3.31(m, 1H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for C₂₂H₁₉CIN₂O₅, 427.1054; found, 427.1058.



94: 2-chlorophenyl 4-(4-methoxyphenyl)piperazine-1-carboxylate 85% B

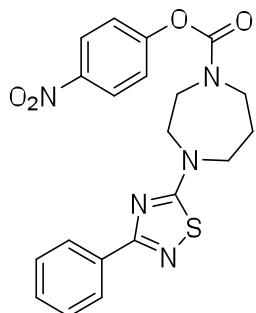
$^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.45-7.43 (m, 1H), 7.33-7.21 (m, 3H), 6.79-6.77 (m, 2H), 6.65-6.63 (m, 2H), 4.18 (s, 1H), 3.57-3.48 (m, 4H), 2.41-2.37 (m, 4H).

HRMS (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{19}\text{ClN}_2\text{O}_3$, 347.1156; found, 347.1156.

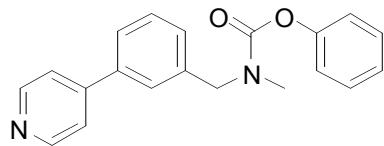


95: 2-chlorophenyl 4-(bis(4-fluorophenyl)methyl)piperazine-1-carboxylate

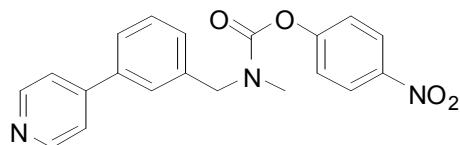
88% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.45-7.43 (m, 1H), 7.35 (q, $J=9\text{Hz}$, 4H), 7.25-7.23 (m, 3H), 7.02 (q, $J=9\text{Hz}$, 4H), 4.27 (s, 1H), 3.63-3.54 (m, 4H), 2.41-2.39 (m, 4H). **HRMS (m/z):** $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{24}\text{H}_{21}\text{ClF}_2\text{N}_2\text{O}_2$, 443.1332; found, 443.1335.



96: 4-nitrophenyl 4-(3-phenyl-1,2,4-thiadiazol-5-yl)-1,4-diazepane-1-carboxylate 85% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25-8.14 (m, 4H), 7.43-7.41 (m, 3H), 7.21-7.18 (m, 2H), 3.96-3.86 (m, 6H), 3.70-3.62 (m, 2H), 2.19-2.13 (m, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{19}\text{N}_5\text{O}_4\text{S}$, 426.123; found, 426.1231.

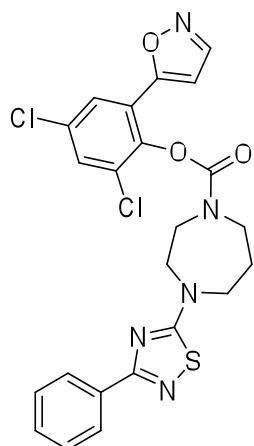


97: phenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 64% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.69 (m, 2H), 7.59-7.42 (m, 5H), 7.40 (m, 3H), 7.20 (m, 3H), 4.73-4.64 (m, 2H), 3.08-3.04 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{18}\text{N}_2\text{O}_2$, 319.1441; found, 319.1443.

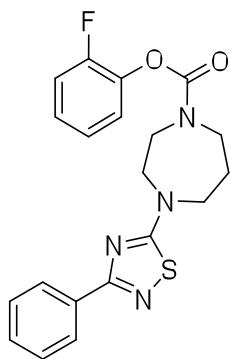


98: 4-nitrophenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 81% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.72 (s, 2H), 8.28 (m, 2H), 7.60-7.54 (m, 5H), 7.31 (m, 3H),

4.75-4.65 (m, 2H), 3.11-3.08 (m, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₀H₁₇N₃O₄, 364.1292; found, 364.1297.

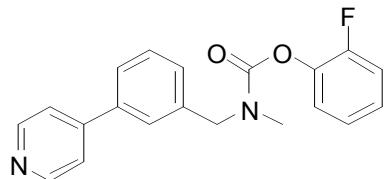


99: 2,4-dichloro-6-(isoxazol-5-yl)phenyl 4-(3-phenyl-1,2,4-thiadiazol-5-yl)-1,4-diazepane-1-carboxylate 69% B ¹H-NMR (600 MHz, CDCl₃): δ 8.15-8.12 (m, 3H), 7.75-7.73 (m, 1H), 7.46-7.43 (m, 1H), 7.39-7.34 (m, 3H), 6.41-6.39(m, 1H), 4.03-3.63(m, 8H), 2.25-2.17 (m, 2H). **HRMS** (m/z): [M+H]⁺calculated for C₂₃H₁₉Cl₂N₅O₃S, 516.0658; found, 516.0659.

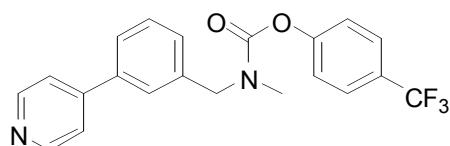


100: 2-fluorophenyl 4-(3-phenyl-1,2,4-thiadiazol-5-yl)-1,4-diazepane-1-carboxylate 74% B ¹H-NMR (600 MHz, CDCl₃): δ 8.22-8.20 (m, 2H), 7.43-7.41 (m, 3H), 7.17-7.14 (m, 4H), 3.93-3.81 (m, 6H), 3.66-3.61(m, 2H), 2.25-2.16(m,

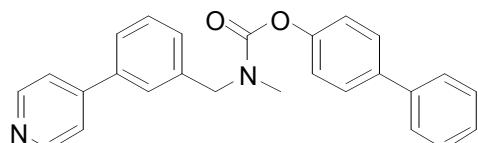
2H). **HRMS** (m/z): [M+H]⁺calculated for C₂₀H₁₉FN₄O₂S, 399.1285; found, 399.1287.



101: 2-fluorophenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 81% **B** ¹H-NMR (600 MHz, CDCl₃): δ 8.70 (m, 2H), 7.60-7.42 (m, 6H), 7.25-7.19 (m, 4H), 4.73 (d, 2H), 3.08 (d, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₀H₁₇FN₂O₂, 337.1347; found, 337.1348.

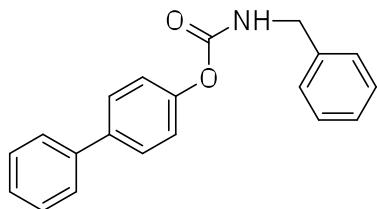


102: 4-(trifluoromethyl)phenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 79% **B** ¹H-NMR (600 MHz, CDCl₃): δ 8.70 (m, 2H), 7.64-7.30 (m, 8H), 7.26 (m, 2H), 4.74-4.64 (m, 2H), 3.10-3.06 (m, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₁H₁₇F₃N₂O₂, 387.1315; found, 387.1318.

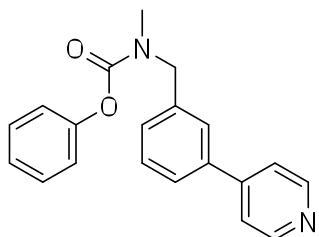


103: biphenyl-4-yl methyl(3-(pyridin-4-yl)benzyl)carbamate 72% **B** ¹H-NMR (600MHz, CDCl₃): δ 8.69 (m, 2H), 7.58-7.25 (m, 13H), 7.21 (m, 2H), 4.75-4.65

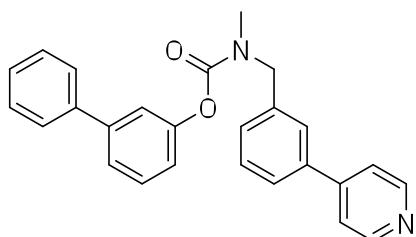
(m, 2H), 3.10-3.06(m, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₆H₂₂N₂O₂, 395.1754; found, 395.1759.



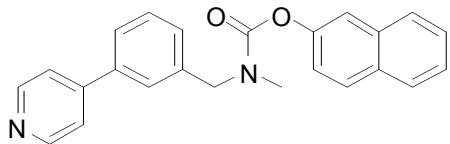
104: biphenyl-4-yl benzylcarbamate 83% B ¹H-NMR (600 MHz, CDCl₃): δ 7.58-7.56 (m, 4H), 7.44-7.41 (m, 2H), 7.38-7.34 (m, 6H), 7.25-7.21 (m, 2H), 5.36 (s, 1H), 4.48 (m, 2H). **HRMS** (m/z): [M+H]⁺calculated for C₂₀H₁₇NO₂, 304.1331; found, 304.1328.



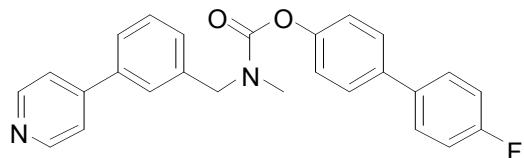
105: phenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 81% B ¹H-NMR (600 MHz, CDCl₃): δ 8.69 (s, 2H), 7.59-7.42 (m, 5H), 7.38-7.36(m, 2H), 7.22-7.12 (m, 3H), 4.73-4.64 (m, 2H), 3.08-3.04 (m, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₀H₁₈N₂O₂, 319.144; found, 319.1435.



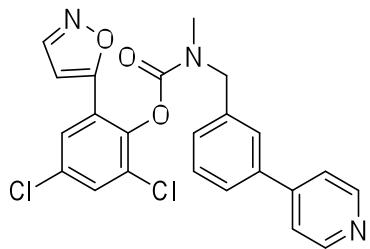
106: biphenyl-3-yl methyl(3-(pyridin-4-yl)benzyl)carbamate 75% B $^1\text{H-NMR}$ (600MHz, CDCl_3): δ 8.67 (m, 2H), 7.61-7.43 (m, 14H), 7.30 (m, 1H), 4.76-4.66 (m, 2H), 3.11-3.07 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{26}\text{H}_{22}\text{N}_2\text{O}_2$, 395.1754; found, 395.1749.



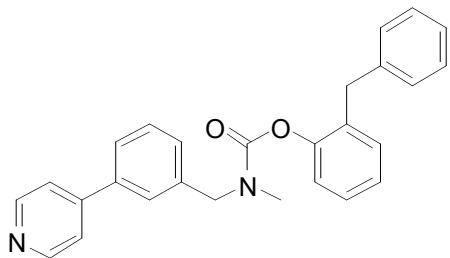
107: naphthalen-2-yl methyl(3-(pyridin-4-yl)benzyl)carbamate 78% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.67 (m, 2H), 7.83 (m, 3H), 7.61-7.25 (m, 10H), 4.79-4.67 (m, 2H), 3.14-3.08 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{24}\text{H}_{20}\text{N}_2\text{O}_2$, 369.1598; found, 369.1593



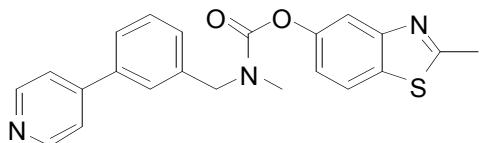
108: 4'-fluorobiphenyl-4-yl methyl(3-(pyridin-4-yl)benzyl)carbamate 77% B $^1\text{H-NMR}$ (600MHz, CDCl_3): δ 8.68 (m, 2H), 7.60-7.43 (m, 10H), 7.17-7.09 (m, 4H), 4.75-4.65 (m, 2H), 3.10-3.06 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{26}\text{H}_{21}\text{FN}_2\text{O}_2$, 413.1660; found, 413.1665.



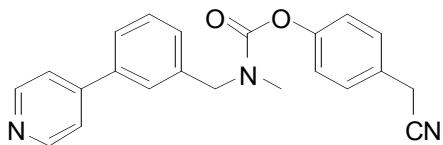
109: 2,4-dichloro-6-(isoxazol-5-yl)phenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 57% B ^1H -NMR (600 MHz, CDCl_3): δ 8.69-8.67(m, 2H), 8.22-8.21 (m, 1H), 7.84-7.83 (m, 1H), 7.56-7.49 (m, 7H), 6.53-6.52 (m, 1H), 4.69-4.65 (m, 2H), 3.18-3.09 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{23}\text{H}_{17}\text{Cl}_2\text{N}_3\text{O}_3$, 454.0719; found, 454.0712.



110: 2-benzylphenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 56% B ^1H -NMR (600MHz, CDCl_3): δ 8.62 (m, 2H), 7.57-7.43 (m, 7H), 7.25-7.15 (m, 8H), 4.59 (s, 2H), 3.96 (s, 2H, rotamer1), 3.90 (s, 2H, rotamer 2), 3.03 (s, 3H, rotamer1), 2.94 (s, 3H, rotamer2) . **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{27}\text{H}_{24}\text{N}_2\text{O}_2$, 409.1911; found, 409.1919.

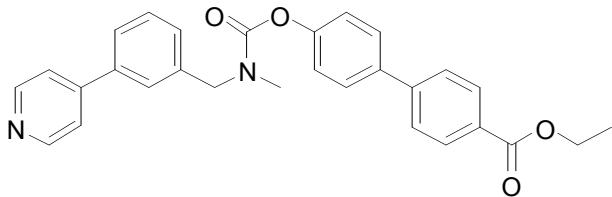


111: 2-methylbenzo[d]thiazol-5-yl methyl(3-(pyridin-4-yl)benzyl)carbamate 78% B ^1H -NMR (600 MHz, CDCl_3): δ 8.68 (m, 2H), 7.76 (m, 2H), 7.67-7.43 (m, 6H), 7.23 (m, 1H), 4.77 (s, 2H, rotamer1), 4.66 (s, 2H, rotamer 2), 3.12 (s, 3H, rotamer 1), 3.07 (s, 3H, rotamer2), 2.84 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{22}\text{H}_{19}\text{N}_3\text{O}_2\text{S}$, 390.1271; found, 390.1274.



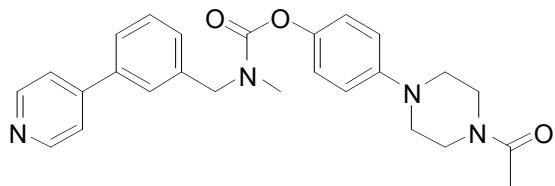
112: 4-(cyanomethyl)phenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 79% B

¹H-NMR (600 MHz, CDCl₃): δ 8.68 (m, 2H), 7.58-7.33 (m, 8H), 7.16 (m, 2H), 4.73 (s, 2H, rotamer1), 4.63 (s, 2H, rotamer 2), 3.75 (s, 2H), 3.09 (s, 3H, rotamer1), 3.05 (s, 3H, rotamer2). HRMS (m/z): [M+H]⁺calculated for C₂₂H₁₉N₃O₂, 358.1550; found, 358.1553.



113: ethyl 4'-(methyl(3-(pyridin-4-yl)benzyl)carbamoyloxy)biphenyl-4-

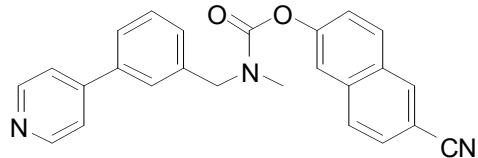
carboxylate 77% B ¹H-NMR (600 MHz, CDCl₃): δ 8.68 (s, 2H), 8.1 (m, 2H), 7.63-7.44 (m, 10H), 7.27-7.21 (m, 2H), 4.76 (s, 2H, rotamer1), 4.66 (s, 2H, rotamer 2), 4.38 (q, 2H, J = 7.2 Hz), 3.11 (s, 3H, rotamer1), 3.07 (s, 3H, rotamer 2), 1.41 (t, 3H, J = 7.16 Hz). HRMS (m/z): [M+H]⁺calculated for C₂₉H₂₆N₂O₄, 467.1966; found, 467.1962.



114: 4-(4-acetylpirperazin-1-yl)phenyl methyl(3-(pyridin-4-

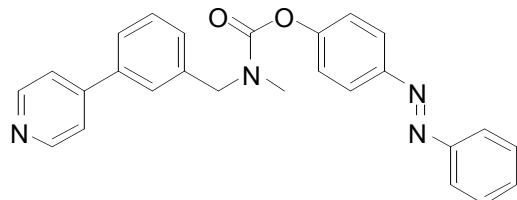
yl)benzyl)carbamate 74% B ¹H-NMR (600 MHz, CDCl₃): δ 8.67 (s, 2H), 7.58-7.41 (m, 4H), 7.08-6.83 (m, 6H), 4.72 (s, 2H, rotamer1), 4.63 (s, 2H, rotamer 2),

3.77-3.61 (m, 4H), 3.10 (m, 4H), 3.07 (s, 3H, rotamer 1), 3.03 (s, 3H, rotamer 2), 2.14 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{26}\text{H}_{28}\text{N}_4\text{O}_3$, 445.2234; found, 445.2238.



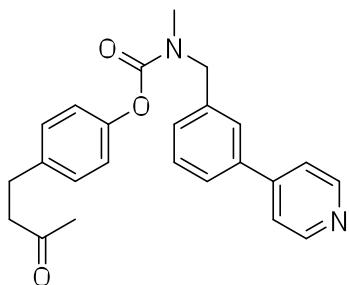
115: 6-cyanonaphthalen-2-yl methyl(3-(pyridin-4-yl)benzyl)carbamate 75%

B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.68 (s, 2H), 8.23 (m, 2H), 7.93-7.45 (m, 6H), 7.08-6.83 (m, 4H), 4.79 (s, 2H, rotamer1), 4.67 (s, 2H, rotamer 2), 3.15 (s, 3H, rotamer1), 3.05 (s, 3H, rotamer2). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{25}\text{H}_{19}\text{N}_3\text{O}_2$, 394.1550; found, 394.1551.



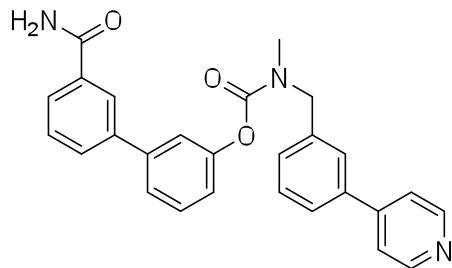
116: (E)-4-(phenyldiazenyl)phenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 79%

B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.68 (s, 2H), 7.96-7.91(m, 4H), 7.60-7.48 (m, 9H), 7.30 (m, 2H), 4.76 (s, 2H, rotamer1), 4.66 (s, 2H, rotamer 2), 3.11 (s, 3H, rotamer1), 3.07 (s, 3H, rotamer2). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{26}\text{H}_{22}\text{N}_4\text{O}_2$, 423.1816; found, 423.1813.



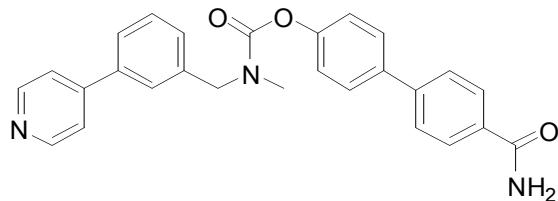
117: 4-(3-oxobutyl)phenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 77% B

¹H-NMR (600 MHz, CDCl₃): δ 8.68 (s, 2H), 7.58-7.41 (m, 6H), 7.18-7.07 (m, 4H), 4.72-4.63 (m, 2H), 3.08-3.03 (m, 3H), 2.89-2.75 (m, 4H), 2.14 (s, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₄H₂₄N₂O₃, 389.1859; found, 389.1856.



118: 3'-carbamoylbiphenyl-3-yl methyl(3-(pyridin-4-yl)benzyl)carbamate

75% B ¹H-NMR (600 MHz, CDCl₃): δ 8.69 (s, 2H), 7.91-7.87 (m, 3H), 7.79-7.69 (m, 5H), 7.48-7.41 (m, 6H), 4.75-4.68 (m, 2H), 3.11-3.07 (m, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₇H₂₃N₃O₃, 438.1811; found, 438.1814.

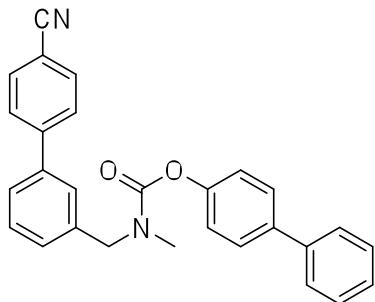


119: 4'-carbamoylbiphenyl-4-yl methyl(3-(pyridin-4-yl)benzyl)carbamate

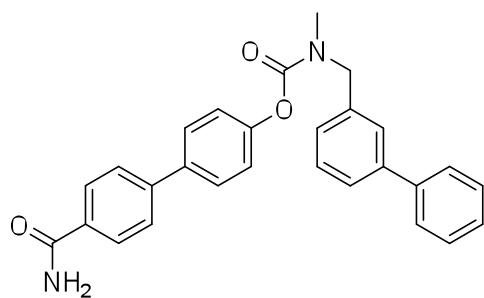
65% B ¹H-NMR (600 MHz, CDCl₃): δ 8.68 (s, 2H), 7.88 (m, 2H), 7.65-7.59 (m, 10H), 7.23 (m, 2H), 4.76 (s, 2H, rotamer1), 4.66 (s, 2H, rotamer 2), 3.11 (s, 3H, rotamer1), 3.07 (s, 3H, rotamer2). **HRMS** (m/z): [M+H]⁺calculated for C₂₇H₂₃N₃O₃, 438.1812; found, 438.1817.



121: biphenyl-4-yl biphenyl-3-ylmethylcarbamate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.56-7.51 (m, 3H), 7.46-7.21 (m, 12H), 6.88-6.85 (m, 3H), 5.41 (s, 1H), 4.55-4.53 (m, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{26}\text{H}_{21}\text{NO}_2$, 380.1644; found, 380.1638.

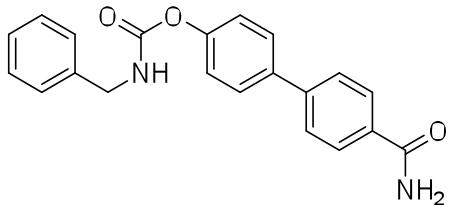


122: biphenyl-4-yl (4'-cyanobiphenyl-3-yl)methyl(methyl)carbamate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.85-7.78 (m, 7H), 7.52-7.36 (m, 7H), 7.21-7.17 (m, 3H), 4.72 (s, 2H), 3.09 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{28}\text{H}_{22}\text{N}_2\text{O}_2$, 419.1753; found, 419.1755.

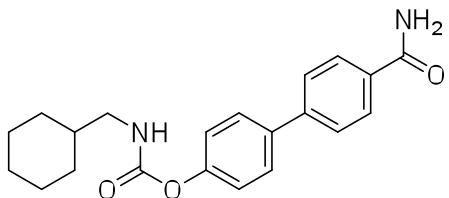


123: 4'-carbamoylbiphenyl-4-yl biphenyl-3-ylmethyl(methyl)carbamate 77%

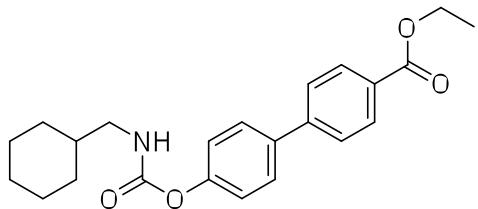
B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.89-7.87 (m, 2H), 7.65-7.64 (m, 8H), 7.46-7.33 (m, 5H), 7.26-7.25 (m, 2H), 4.74-4.54 (m, 2H), 3.09-3.02 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{28}\text{H}_{24}\text{N}_2\text{O}_3$, 437.1859; found, 437.1864.



124: 4'-carbamoylbiphenyl-4-yl benzylcarbamate 74% **B** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.08-8.06 (m, 2H), 7.80-7.78 (m, 4H), 7.33-7.19 (m, 7H), 4.19 (s, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{18}\text{N}_2\text{O}_3$, 347.1389; found, 347.1395.

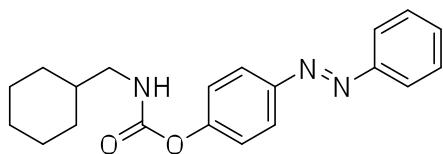


125: 4'-carbamoylbiphenyl-4-yl cyclohexylmethyloxymethylcarbamate 75% **B** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.07-8.05 (m, 2H), 7.78-7.75 (m, 4H), 7.14-7.11 (m, 2H), 2.92 (d, $J=7\text{Hz}$, 2H), 2.05-2.03 (m, 1H), 1.61-1.44 (m, 10H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{24}\text{N}_2\text{O}_3$, 353.1859; found, 353.1862.

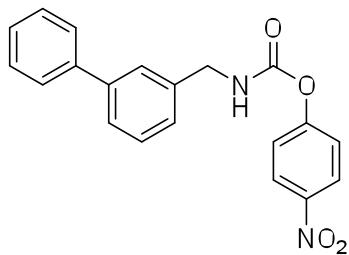


126: ethyl 4'-(cyclohexylmethylcarbamoyloxy)biphenyl-4-carboxylate 79% B

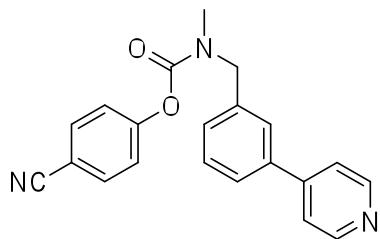
¹H-NMR (600 MHz, CDCl₃): δ 7.91-7.89 (m, 2H), 7.75-7.73 (m, 4H), 7.15-7.13 (m, 2H), 4.27 (q, J=8Hz, 2H), 3.12(dd, J = 7 Hz,13Hz, 2H), 2.06-2.04 (m, 1H), 1.49-1.27 (m, 13H). HRMS (m/z): [M+H]⁺calculated for C₂₃H₂₇NO₄, 382.2012; found, 382.2012.



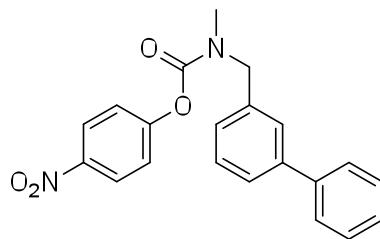
127: (E)-4-(phenyldiazenyl)phenyl cyclohexylmethylcarbamate 77% B ¹H-NMR (600 MHz, CDCl₃): δ 7.97-7.95 (m, 4H), 7.67-7.65 (m, 2H), 7.47-7.45 (m, 2H), 7.26-7.24 (m, 1H), 5.09 (b, 1H), 3.08 (dd, J = 7 Hz,13Hz, 2H), 2.07-2.04 (m, 1H), 1.53-1.46 (m, 10H). HRMS (m/z): [M+H]⁺calculated for C₂₀H₂₃N₃O₂, 338.1862; found, 338.1869.



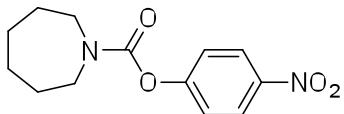
128: 4-nitrophenyl biphenyl-3-ylmethylcarbamate 85% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24 (d, $J=9\text{Hz}$, 2H), 7.64-7.59 (m, 4H), 7.48-7.46 (m, 5H), 7.31 (d, $J=9\text{Hz}$, 2H), 5.52 (s, 1H), 4.56-4.53 (m, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{16}\text{N}_2\text{O}_4$, 349.1182; found, 349.1188.



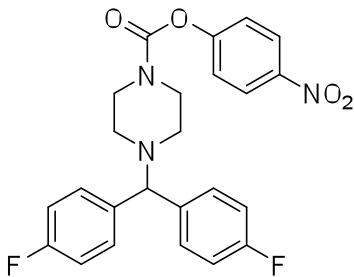
129: 4-cyanophenyl methyl(3-(pyridin-4-yl)benzyl)carbamate 87% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.74-8.72 (m, 2H), 7.97-7.95 (m, 2H), 7.83-7.79 (m, 3H), 7.46-7.41 (m, 4H), 7.17-7.15 (m, 1H), 4.56 (s, 2H), 3.35 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{17}\text{N}_3\text{O}_2$, 344.1393; found, 344.1389.



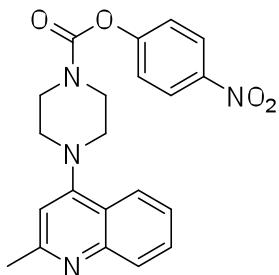
130: 4-nitrophenyl biphenyl-3-ylmethyl(methyl)carbamate 85% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24 (d, $J=9\text{Hz}$, 2H), 7.78-7.76 (m, 1H), 7.55-7.33 (m, 7H), 7.31 (d, $J=9\text{Hz}$, 2H), 7.18-7.16 (m, 1H), 4.59-4.49 (m, 2H), 3.08-3.02 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{18}\text{N}_2\text{O}_4$, 363.1339; found, 363.1331.



151: 4-nitrophenyl azepane-1-carboxylate 89% B $^1\text{H-NMR}$ (600 MHz, CDCl_3):
 δ 8.25 (d, $J=9\text{Hz}$, 2H), 7.31 (d, $J=9\text{Hz}$, 2H), 3.59 (t, $J=6\text{Hz}$, 2H), 3.54 (t, $J=6\text{Hz}$, 2H), 1.81-1.79 (m, 4H), 1.65-1.63 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{16}\text{N}_2\text{O}_4$, 265.1183; found, 265.1188.

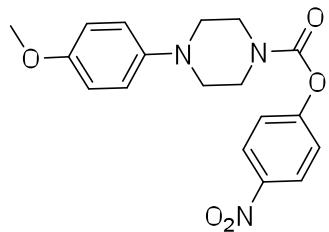


152: 4-nitrophenyl 4-(bis(4-fluorophenyl)methyl)piperazine-1-carboxylate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24 (d, $J=9\text{Hz}$, 2H), 7.37 (q, $J=9\text{Hz}$, 4H), 7.27 (d, $J=9\text{Hz}$, 2H), 7.00 (q, $J=9\text{Hz}$, 4H), 4.30 (s, 1H), 3.67-3.58 (m, 4H), 2.45-2.43 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{24}\text{H}_{21}\text{F}_2\text{N}_3\text{O}_4$, 454.1572; found, 454.1576.

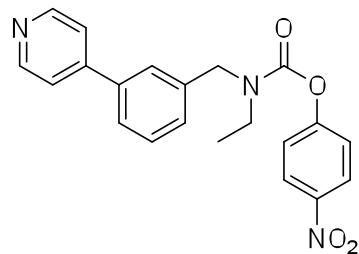


153: 4-nitrophenyl 4-(2-methylquinolin-4-yl)piperazine-1-carboxylate 81% B
 $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.28 (d, $J=9\text{Hz}$, 2H), 8.02-7.98 (m, 2H), 7.67(t,

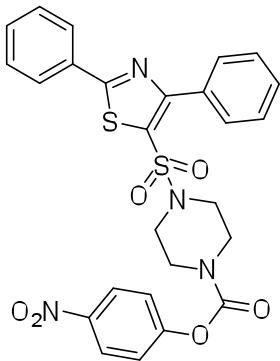
J=10Hz, 1H), 7.48 (t, *J*=10Hz, 1H), 7.34 (d, *J*=9Hz, 2H), 6.79 (s, 1H), 3.99-3.89 (m, 4H), 3.30-3.28 (m, 4H), 2.71 (s, 1H). **HRMS** (m/z): **[M+H]⁺**calculated for C₂₁H₂₀N₄O₄, 393.1557; found, 393.1564.



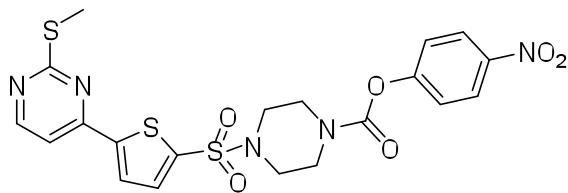
154: 4-nitrophenyl 4-(4-methoxyphenyl)piperazine-1-carboxylate 83% B ¹H-NMR (600 MHz, CDCl₃): δ 8.27 (d, *J*=9Hz, 2H), 7.34 (d, *J*=9Hz, 2H), 6.93-6.88 (m, 4H), 3.84-3.82(m, 2H), 3.79(s, 3H), 3.75-3.72(m, 2H), 3.14-3.12(m, 4H). **HRMS** (m/z): **[M+H]⁺**calculated for C₁₈H₁₉N₃O₅, 358.1379; found, 358.1371.



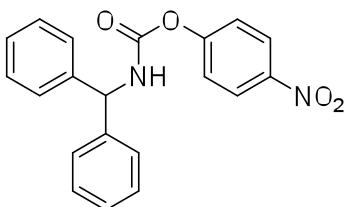
155: 4-nitrophenyl ethyl(3-(pyridin-4-yl)benzyl)carbamate 74% B ¹H-NMR (600 MHz, CDCl₃): δ 8.72 (s, 2H), 8.28 (d, *J*=9Hz, 2H), 7.60-7.54 (m, 6H), 7.27 (d, *J*=9Hz, 2H), 4.73-4.64 (m, 2H), 3.10-3.07 (m, 2H), 1.31 (t, *J*=8Hz, 3H). **HRMS** (m/z): **[M+H]⁺**calculated for C₂₀H₁₇N₃O₄, 364.1292; found, 364.1297. **HRMS** (m/z): **[M+H]⁺**calculated for C₂₁H₁₉N₃O₄, 378.1448; found, 378.1446.



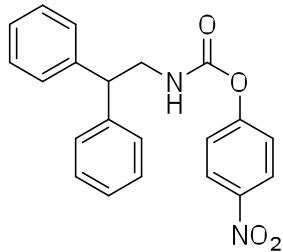
156: 4-nitrophenyl 4-(2,4-diphenylthiazol-5-ylsulfonyl)piperazine-1-carboxylate 73% C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.26 (d, $J=9\text{Hz}$, 2H), 8.03-7.81 (m, 4H), 7.56-7.49 (m, 6H), 7.27(d, $J=9\text{Hz}$, 2H), 3.85-3.76(m, 4H), 3.25(s, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{26}\text{H}_{22}\text{N}_4\text{O}_6\text{S}_2$, 551.1053; found, 551.1059.



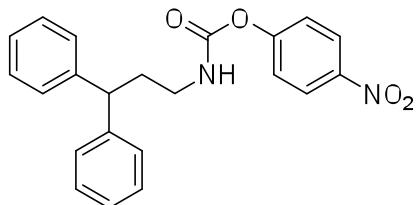
157: 4-nitrophenyl 4-(5-(2-(methylthio)pyrimidin-4-yl)thiophen-2-ylsulfonyl)piperazine-1-carboxylate 71% C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.59 (d, $J=9\text{Hz}$, 1H), 8.23-8.22 (m, 2H), 8.02 (s, 1H), 7.72 (d, $J=9\text{Hz}$, 1H), 7.58-7.57 (m, 1H), 7.28-7.25(m, 2H), 3.84-3.74(m, 4H), 3.24(b, 4H), 2.70 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{19}\text{N}_5\text{O}_6\text{S}_3$, 522.0569; found, 522.0575.



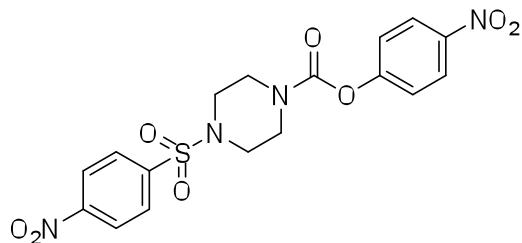
158: 4-nitrophenyl benzhydrylcarbamate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3):
 δ 8.23 (d, $J=9\text{Hz}$, 2H), 7.35-7.31 (m, 6H), 7.27 (d, $J=9\text{Hz}$, 2H), 7.18-7.12(m, 4H),
5.51(s, 1H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{16}\text{N}_2\text{O}_4$, 349.1182; found,
349.1186.



159: 4-nitrophenyl 2,2-diphenylethylcarbamate 81% B $^1\text{H-NMR}$ (600 MHz,
 CDCl_3): δ 8.24 (d, $J=9\text{Hz}$, 2H), 7.33-7.28 (m, 6H), 7.25 (d, $J=9\text{Hz}$, 2H), 7.14-7.09
(m, 4H), 4.62(t, $J=7\text{Hz}$, 1H), 3.49 (d, $J=7\text{Hz}$, 2H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated
for $\text{C}_{21}\text{H}_{18}\text{N}_2\text{O}_4$, 363.1339; found, 363.1343.

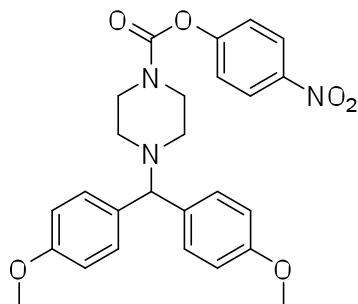


160: 4-nitrophenyl 3,3-diphenylpropylcarbamate 86% B $^1\text{H-NMR}$ (600 MHz,
 CDCl_3): δ 8.23 (d, $J=9\text{Hz}$, 2H), 7.31-7.26 (m, 6H), 7.26 (d, $J=9\text{Hz}$, 2H), 7.12-7.07
(m, 4H), 4.05(t, $J=7\text{Hz}$, 1H), 3.21 (t, $J=7\text{Hz}$, 2H), 1.98 (m, 2H). **HRMS** (m/z):
 $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{22}\text{H}_{20}\text{N}_2\text{O}_4$, 377.1495; found, 377.1491.



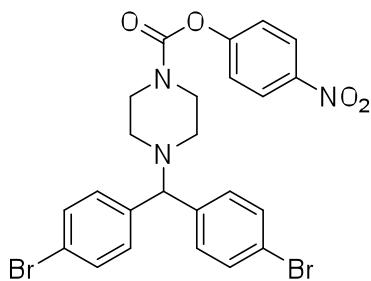
161: 4-nitrophenyl 4-(4-nitrophenylsulfonyl)piperazine-1-carboxylate 79% C

¹H-NMR (600 MHz, CDCl₃): δ 8.43 (d, J=9Hz, 2H), 8.24 (d, J=9Hz, 2H), 7.99 (d, J=9Hz, 2H), 7.24(d, J=9Hz, 2H), 3.81-3.71 (m, 4H), 3.19 (s, 4H). HRMS (m/z): [M+H]⁺calculated for C₁₇H₁₆N₄O₈S, 437.0761; found, 437.0768.



162: 4-nitrophenyl 4-(bis(4-methoxyphenyl)methyl)piperazine-1-carboxylate

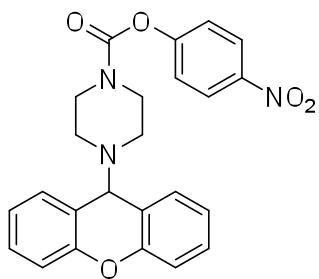
78% C ¹H-NMR (600 MHz, CDCl₃): δ 8.24 (d, J=9Hz, 2H), 7.31 (d, J=12Hz, 4H), 7.27(d, J=9Hz, 2H), 6.84(d, J=12Hz, 4H), 4.22 (s, 1H), 3.77 (s, 6H), 3.66-3.57 (m, 4H), 2.44 (s, 4H). HRMS (m/z): [M+H]⁺calculated for C₂₆H₂₇N₃O₆, 478.1972; found, 478.1969.



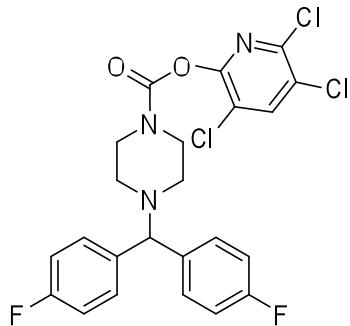
163: 4-nitrophenyl 4-(bis(4-bromophenyl)methyl)piperazine-1-carboxylate

77% C ¹H-NMR (600 MHz, CDCl₃): δ 8.25(d, J=9Hz, 2H), 7.45-7.43 (m, 6H),

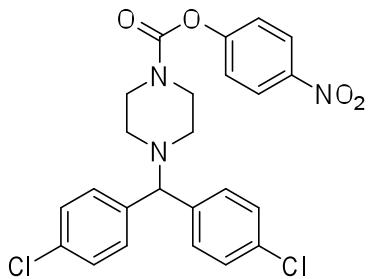
7.27-7.25(m, 2H), 4.24 (s, 1H), 3.67-3.64 (m, 4H), 2.45-2.42 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{24}\text{H}_{21}\text{Br}_2\text{N}_3\text{O}_4$, 573.9971; found, 573.9973.



164: 4-nitrophenyl 4-(9H-xanthen-9-yl)piperazine-1-carboxylate 73% C ^1H -NMR (600 MHz, CDCl_3): δ 8.20(d, $J=9\text{Hz}$, 2H), 7.37-7.33 (m, 4H), 7.25-7.17(m, 6H), 4.90 (s, 1H), 3.54-3.47 (m, 4H), 2.44-2.36 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{24}\text{H}_{21}\text{N}_3\text{O}_5$, 432.1553; found, 432.1549.

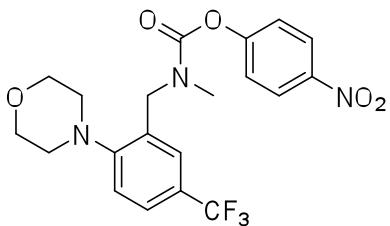


170: 3,5,6-trichloropyridin-2-yl 4-(bis(4-fluorophenyl)methyl)piperazine-1-carboxylate 69% C ^1H -NMR (600 MHz, CDCl_3): δ 7.50(s, 1H), 7.38-7.34 (m, 5H), 7.01-6.97(m, 4H), 4.28 (s, 1H), 3.69-3.57 (m, 4H), 2.43 (s, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{23}\text{H}_{18}\text{Cl}_3\text{F}_2\text{N}_3\text{O}_2$, 512.0505; found, 512.0501.



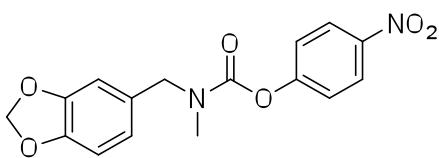
173: 4-nitrophenyl 4-(bis(4-chlorophenyl)methyl)piperazine-1-carboxylate

72% C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.23(d, $J=9\text{Hz}$, 2H), 7.52 (d, $J=14\text{Hz}$, 4H), 7.37(d, $J=14\text{Hz}$, 4H), 6.86 (d, $J=9\text{Hz}$, 2H), 4.70 (s, 1H), 3.96-3.84 (m, 4H), 2.94 (s, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{24}\text{H}_{21}\text{Cl}_2\text{N}_3\text{O}_4$, 486.0981; found, 486.0988.



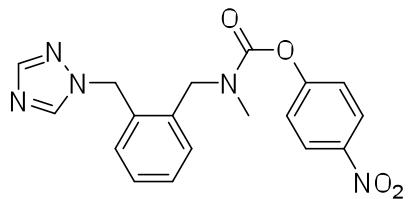
201: 4-nitrophenyl methyl(2-morpholino-5-

(trifluoromethyl)benzyl)carbamate 77% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.29-8.26(m, 2H), 7.57-7.50 (m, 2H), 7.35-7.24(m, 3H), 4.77-4.73 (m, 2H), 3.88-3.87 (m, 4H), 3.04 (s, 3H), 2.95-2.93 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{20}\text{F}_3\text{N}_3\text{O}_5$, 440.1427; found, 440.1421.



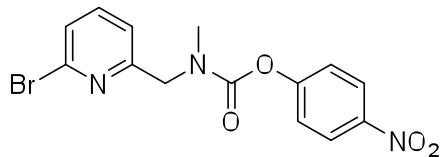
202: 4-nitrophenyl benzo[d][1,3]dioxol-5-ylmethyl(methyl)carbamate 79% B

¹H-NMR (600 MHz, CDCl₃): δ 8.27 (d, J=9Hz, 2H), 7.35 (d, J=9Hz, 2H), 6.83-6.78 (m, 3H), 5.98(d, J=12Hz ,2H), 4.55-4.46 (m, 2H), 3.03-2.99 (m, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₆H₁₄N₂O₆, 331.0924; found, 331.0931.



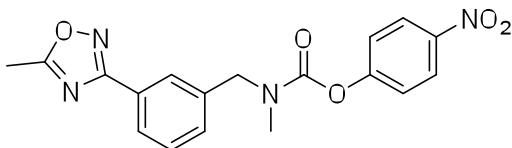
203: 4-nitrophenyl 2-((1H-1,2,4-triazol-1-yl)methyl)benzyl(methyl)carbamate

74% B ¹H-NMR (600 MHz, CDCl₃): δ 8.26-8.24 (m, 2H), 8.02-7.93 (m, 2H), 7.39-7.31 (m, 6H), 5.45-5.41(m ,2H), 4.74-4.68 (m, 2H), 2.97 (s, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₈H₁₇N₅O₄, 368.1353; found, 368.1359.

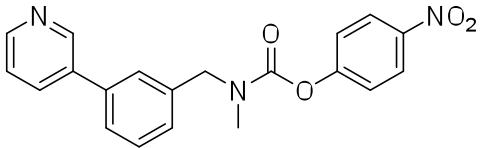


204: 4-nitrophenyl (6-bromopyridin-2-yl)methyl(methyl)carbamate 67% B

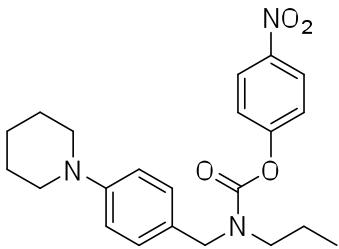
¹H-NMR (600 MHz, CDCl₃): δ 8.26-8.24 (m, 2H), 7.60-7.57 (m, 1H), 7.46-7.43 (m, 1H), 7.36-7.34(m ,1H), 7.29-7.24(m ,2H), 4.74-4.68 (m, 2H), 3.21-3.11 (m, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₁₄H₁₂BrN₃O₄, 366.0083; found, 366.0084.



205: 4-nitrophenyl methyl(3-(5-methyl-1,2,4-oxadiazol-3-yl)benzyl)carbamate 72% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25-8.23 (m, 2H), 8.04-8.02 (m, 2H), 7.49-7.46 (m, 2H), 7.37-7.33 (m, 2H), 4.71-4.63 (m, 2H), 3.08-3.05 (m, 3H), 2.67 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{16}\text{N}_4\text{O}_5$, 369.1193; found, 369.1198.

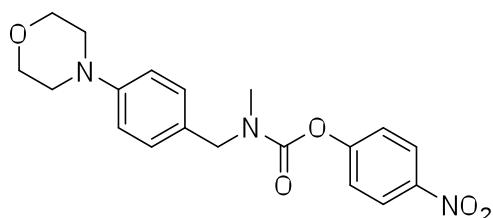


206: 4-nitrophenyl methyl(3-(pyridin-3-yl)benzyl)carbamate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.88-8.63 (m, 2H), 8.27-8.24 (m, 2H), 7.78-7.73 (m, 1H), 7.52-7.34 (m, 7H), 4.74-4.64 (m, 2H), 3.11-3.07 (m, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{20}\text{H}_{17}\text{N}_3\text{O}_4$, 364.1291; found, 364.1296.



207: 4-nitrophenyl 4-(piperidin-1-yl)benzyl(propyl)carbamate 77% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.27-8.23 (m, 2H), 7.33-7.31 (m, 2H), 7.20-7.15 (m, 2H), 6.93-6.91 (m, 2H), 4.54-4.47 (m, 2H), 3.30 (t, $J=18\text{Hz}$, 2H), 3.16 (t, $J=6\text{Hz}$, 4H),

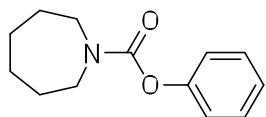
1.71-1.68(m, 8H), 0.92 (t, J=6Hz, 3H). **HRMS** (m/z): [M+H]⁺calculated for C₂₂H₂₇N₃O₄, 398.2074; found, 398.2078.



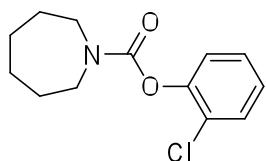
208: 4-nitrophenyl methyl(4-morpholinobenzyl)carbamate 77% B ¹H-NMR

(600 MHz, CDCl₃): δ 8.26-8.24 (m, 2H), 7.34-7.23(m, 4H), 6.92-6.90 (m, 2H), 4.56-4.47 (m, 2H), 3.87 (t, J=6Hz, 4H), 3.18 (t, J=6Hz, 4H), 3.02-2.98 (m, 2H).

HRMS (m/z): [M+H]⁺calculated for C₁₉H₂₁N₃O₅, 372.1553; found, 372.1558.



209: phenyl azepane-1-carboxylate 79% B ¹H-NMR (600 MHz, CDCl₃): δ 7.37-7.33 (m, 2H), 7.18-7.11(m, 3H), 3.59 (t, J=6Hz, 2H), 3.53 (t, J=6Hz, 2H), 1.80-1.77 (m, 4H), 1.64-1.62 (m, 4H). **HRMS** (m/z): [M+H]⁺calculated for C₁₃H₁₇NO₂, 220.1331; found, 220.1332.

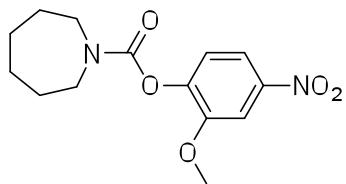


210: 2-chlorophenyl azepane-1-carboxylae 83% B $^1\text{H-NMR}$ (600 MHz, CDCl_3):

δ 7.42-7.40 (m, 1H), 7.25-7.21(m, 2H), 7.14-7.12(m, 1H), 3.63(t, $J=6\text{Hz}$, 2H),

3.53 (t, $J=6\text{Hz}$, 2H), 1.85-1.78 (m, 4H), 1.66-1.63 (m, 4H). **HRMS** (m/z):

$[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{16}\text{ClNO}_2$, 254.0942; found, 254.0942.

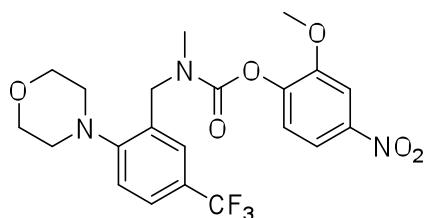


211: 2-methoxy-4-nitrophenyl azepane-1-carboxylate 69% B $^1\text{H-NMR}$ (600 MHz, CDCl_3):

δ 7.88-7.81 (m, 2H), 7.26-7.23(m, 1H), 3.93 (s, 3H), 3.60(t, $J=6\text{Hz}$,

2H), 3.51 (t, $J=6\text{Hz}$, 2H), 1.82-1.78 (m, 4H), 1.65-1.63 (m, 4H). **HRMS** (m/z):

$[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{18}\text{N}_2\text{O}_5$, 295.1288; found, 295.1295.



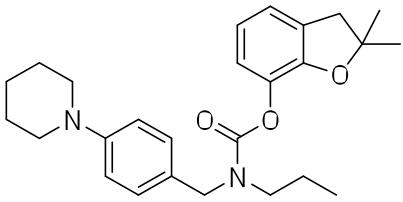
212: 2-methoxy-4-nitrophenyl methyl(2-morpholino-5-

(trifluoromethyl)benzyl)carbamate 55% B $^1\text{H-NMR}$ (600 MHz, CDCl_3):

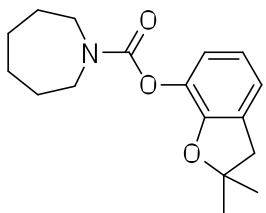
δ 8.0-7.9 (m, 2H), 7.76-7.74(m, 2H), 7.25-7.23(m, 2H), 4.80-4.69(m, 2H), 3.99 (s, 3H),

3.97-3.95 (m, 3H), 3.87(t, $J=6\text{Hz}$, 4H), 2.94 (t, $J=6\text{Hz}$, 4H). **HRMS** (m/z):

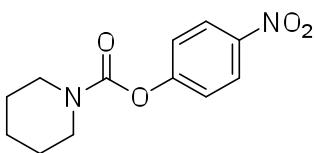
$[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{22}\text{F}_3\text{N}_3\text{O}_6$, 470.1533; found, 470.1537.



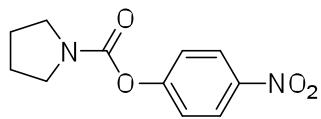
213: 2,2-dimethyl-2,3-dihydrobenzofuran-7-yl 4-(piperidin-1-yl)benzyl(propyl)carbamate 64% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.08-7.01 (m, 5H), 6.82-6.79 (m, 2H), 4.56-4.47 (m, 2H), 3.15 (t, $J=6\text{Hz}$, 4H), 3.05-3.03 (m, 2H), 1.68-1.64 (m, 6H), 1.61-1.54 (m, 7H), 1.51 (s, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{26}\text{H}_{34}\text{N}_2\text{O}_3$, 423.2641; found, 423.2648.



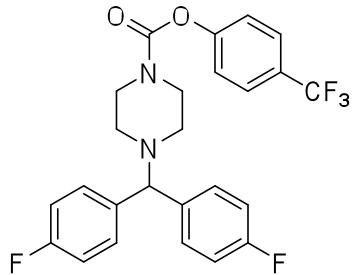
214: 2,2-dimethyl-2,3-dihydrobenzofuran-7-yl azepane-1-carboxylate 69% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 6.96-6.89 (m, 2H), 6.79-6.76 (m, 1H), 3.58 (t, $J=6\text{Hz}$, 2H), 3.49 (t, $J=6\text{Hz}$, 2H), 1.65-1.61 (m, 6H), 1.57-1.53 (m, 4H), 1.48 (s, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{23}\text{NO}_3$, 290.1750; found, 290.1754.



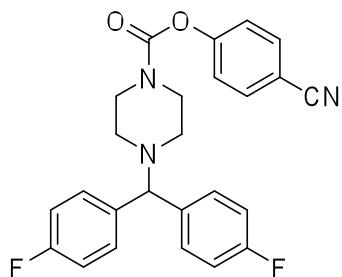
215: 4-nitrophenyl piperidine-1-carboxylate 78% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25-8.23 (m, 2H), 7.30-7.26 (m, 2H), 3.61 (s, 2H), 3.52 (s, 2H), 1.66 (s, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{12}\text{H}_{14}\text{N}_2\text{O}_4$, 251.1026; found, 251.1023.



216: 4-nitrophenyl pyrrolidine-1-carboxylate 81% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24 (d, $J=9\text{Hz}$, 2H), 7.33(d, $J=9\text{Hz}$, 2H), 3.58(t, $J=6\text{Hz}$, 2H), 3.49(t, $J=6\text{Hz}$, 2H), 2.04-1.96 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{11}\text{H}_{12}\text{N}_2\text{O}_4$, 237.0869; found, 237.0872.

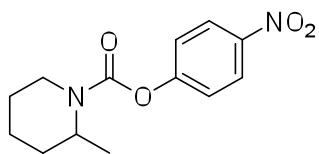


217: 4-(trifluoromethyl)phenyl 4-(bis(4-fluorophenyl)methyl)piperazine-1-carboxylate 88% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.63-7.61(m, 2H), 7.38-7.36 (m, 4H), 7.23-7.21(m, 2H), 7.02-6.98 (m, 4H), 4.29 (s, 1H), 3.67-3.58 (m, 4H), 2.61-2.57 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{25}\text{H}_{21}\text{F}_5\text{N}_2\text{O}_2$, 477.1595; found, 477.1589.

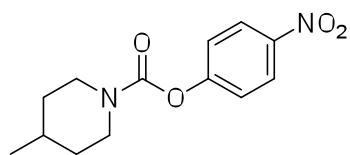


218: 4-cyanophenyl 4-(bis(4-fluorophenyl)methyl)piperazine-1-carboxylate

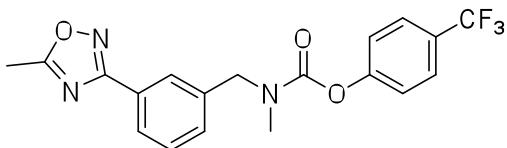
82% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 7.65-7.63(m, 2H), 7.37-7.34 (m, 4H), 7.24-7.22(m, 2H), 7.02-6.97 (m, 4H), 4.29 (s, 1H), 3.66-3.57 (m, 4H), 2.64-2.59 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{25}\text{H}_{21}\text{F}_2\text{N}_3\text{O}_2$, 434.1674; found, 434.1681.



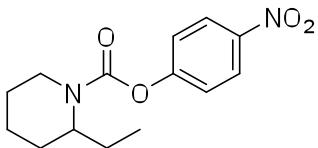
219: 4-nitrophenyl 2-methylpiperidine-1-carboxylate **87% B** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25(d, $J=9\text{Hz}$, 2H), 7.29 (d, $J=9\text{Hz}$, 2H), 4.56(s, 2H), 4.11-4.07 (m, 1H), 2.95 (s, 1H), 1.68-1.59 (m, 6H), 1.28 (d, $J=7\text{Hz}$, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{16}\text{N}_2\text{O}_4$, 265.1182; found, 265.1184.



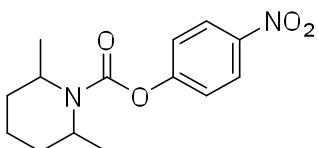
220: 4-nitrophenyl 4-methylpiperidine-1-carboxylate **89% B** $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25(d, $J=9\text{Hz}$, 2H), 7.29 (d, $J=9\text{Hz}$, 2H), 4.22(t, $J=6\text{Hz}$, 2H), 2.99(t, $J=6\text{Hz}$, 1H), 2.86(t, $J=6\text{Hz}$, 1H), 1.74-1.71 (m, 2H), 1.58-1.57 (m, 1H), 1.27-1.21 (m, 2H), 1.18 (d, $J=7\text{Hz}$, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{16}\text{N}_2\text{O}_4$, 265.1182; found, 265.1183.



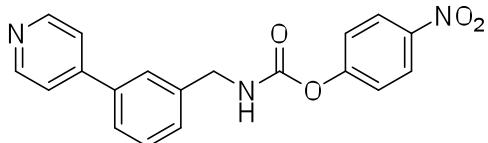
221: 4-(trifluoromethyl)phenyl methyl(3-(5-methyl-1,2,4-oxadiazol-3-yl)benzyl)carbamate 75% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.04-8.00 (m, 2H), 7.65-7.62 (m, 2H), 7.49-7.47 (m, 2H), 7.29-7.26 (m, 2H), 4.71-4.63 (m, 2H), 3.07-3.04 (m, 3H), 2.66 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{16}\text{F}_3\text{N}_3\text{O}_3$, 392.351; found, 392.3516.



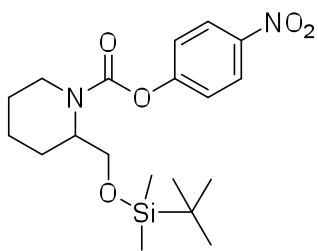
222: 4-nitrophenyl 2-ethylpiperidine-1-carboxylate 81% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25 (d, $J=9\text{Hz}$, 2H), 7.27 (d, $J=9\text{Hz}$, 2H), 4.29 (s, 1H), 4.13-4.10 (m, 1H), 3.36-3.33 (m, 1H), 1.70-1.52 (m, 8H), 0.93 (t, $J=8\text{Hz}$, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{18}\text{N}_2\text{O}_4$, 279.1339; found, 279.1338.



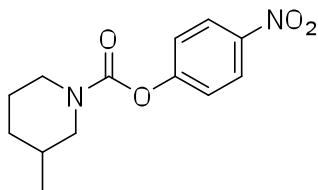
223: 4-nitrophenyl 2,6-dimethylpiperidine-1-carboxylate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.18 (d, $J=9\text{Hz}$, 2H), 7.17 (d, $J=9\text{Hz}$, 2H), 4.22 (t, $J=6\text{Hz}$, 2H), 1.84-1.65 (m, 6H), 1.27 (d, $J=7\text{Hz}$, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{18}\text{N}_2\text{O}_4$, 279.1339; found, 279.1343.



224: 4-nitrophenyl 3-(pyridin-4-yl)benzylcarbamate 83% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25-8.23(m, 2H), 8.15-8.12(m, 2H), 7.49-7.44 (m, 2H), 7.35-7.24 (m, 3H), 6.88-6.85 (m, 2H), 6.55 (s, 1H), 5.63 (s, 1H), 4.46 (d, $J=6\text{Hz}$). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{15}\text{N}_3\text{O}_4$, 350.1135; found, 350.1138.



225: 4-nitrophenyl 2-((tert-butyldimethylsilyloxy)methyl)piperidine-1-carboxylate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24(d, $J=9\text{Hz}$, 2H), 7.30 (d, $J=9\text{Hz}$, 2H), 4.43-4.36(m, 1H), 4.15-4.12 (m, 1H), 3.83-3.73 (m, 2H), 3.09-3.01 (m, 1H), 1.68-1.53 (m, 6H), 0.89 (s, 9H), 0.06 (s, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{19}\text{H}_{30}\text{N}_2\text{O}_5\text{Si}$, 395.1996; found, 395.1994.

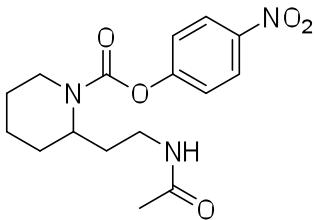


226: 4-nitrophenyl 3-methylpiperidine-1-carboxylate 77% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24(d, $J=9\text{Hz}$, 2H), 7.29(d, $J=9\text{Hz}$, 2H), 4.09-4.05(m, 2H), 3.97-2.48 (m, 2H), 1.88-1.74 (m, 5H), 1.18 (d, $J=7\text{Hz}$, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{16}\text{N}_2\text{O}_4$, 265.1182; found, 265.1187.

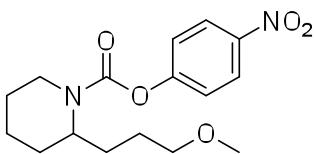


227: 4-nitrophenyl 2-(hydroxymethyl)piperidine-1-carboxylate 65%

(deprotection from 225) $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24(d, $J=9\text{Hz}$, 2H), 7.29(d, $J=9\text{Hz}$, 2H), 4.43-4.39(m, 1H), 4.12-4.10 (m, 2H), 3.94-3.67 (m, 2H), 1.75-1.54(m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{13}\text{H}_{16}\text{N}_2\text{O}_5$, 281.1131; found, 281.1133.

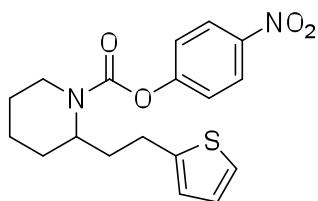


228: 4-nitrophenyl 2-(2-acetamidoethyl)piperidine-1-carboxylate 77% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.27(d, $J=9\text{Hz}$, 2H), 7.29(d, $J=9\text{Hz}$, 2H), 6.33 (s, 1H), 4.40-4.38(m, 1H), 4.20-4.16 (m, 1H), 3.76-3.73 (m, 1H), 3.02-3.00 (m, 1H), 2.75-2.69 (m, 1H), 1.94 (s, 3H), 1.76-1.62 (m, 8H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{21}\text{N}_3\text{O}_5$, 336.1553; found, 336.1559.



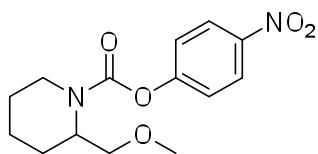
229: 4-nitrophenyl 2-(3-methoxypropyl)piperidine-1-carboxylate 79% B $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24(d, $J=9\text{Hz}$, 2H), 7.28(d, $J=9\text{Hz}$, 2H), 4.38(s, 1H), 4.13-4.09(m, 1H), 3.42 (t, $J=6\text{Hz}$, 2H), 3.33 (s, 3H), 3.01-2.99 (m, 1H), 1.68-1.59

(m, 10H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{16}\text{H}_{22}\text{N}_2\text{O}_5$, 323.1601; found, 323.1604.



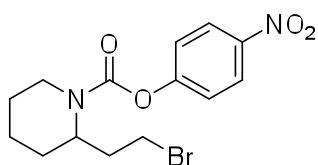
230: 4-nitrophenyl 2-(thiophen-2-yl)ethyl)piperidine-1-carboxylate 77% B

$^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.36-8.33(m, 1H), 8.25(d, $J=9\text{Hz}$, 2H), 7.51-7.49(m, 1H), 7.13-7.11(d, $J=9\text{Hz}$, 2H), 6.92-6.82 (m, 1H), 4.50-4.48(m, 1H), 4.18-4.14 (m, 1H), 2.91-2.88 (m, 1H), 2.24-2.22 (m, 1H), 1.93-1.92 (m, 1H), 1.72-1.56 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{20}\text{N}_2\text{O}_4\text{S}$, 361.1216; found, 361.1214.



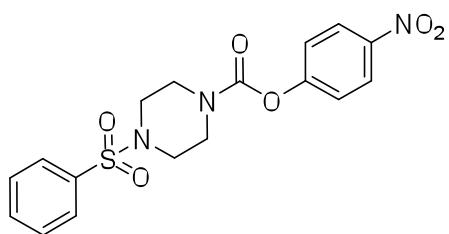
231: 4-nitrophenyl 2-(methoxymethyl)piperidine-1-carboxylate 81% B $^1\text{H-NMR}$

(600 MHz, CDCl_3): δ 8.25(d, $J=9\text{Hz}$, 2H), 7.30(d, $J=9\text{Hz}$, 2H), 4.58-4.56 (m, 1H), 4.16-4.12(m, 1H), 3.72-3.67 (m, 1H), 3.59-3.56 (m, 1H), 3.39 (s, 3H), 2.87-2.85 (m, 1H), 1.78-1.66 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{18}\text{N}_2\text{O}_5$, 295.1288; found, 295.1287.

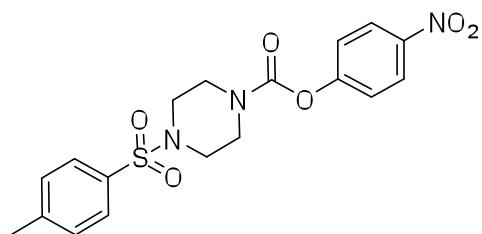


232: 4-nitrophenyl 2-(2-bromoethyl)piperidine-1-carboxylate 79% B $^1\text{H-NMR}$

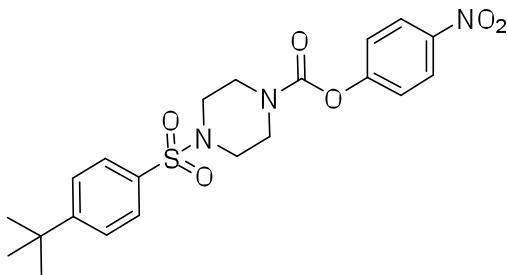
(600 MHz, CDCl_3): δ 8.26(d, $J=9\text{Hz}$, 2H), 7.32(s, 2H), 4.69-4.51 (m, 1H), 4.19-4.15(m, 1H), 3.46-3.38 (m, 2H), 3.12-2.93 (m, 1H), 2.47-2.45 (m, 1H), 2.07-2.04 (m, 1H), 1.76-1.66 (m, 6H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{14}\text{H}_{17}\text{BrN}_2\text{O}_4$, 357.0444; found, 357.0446.



233: 4-nitrophenyl 4-(phenylsulfonyl)piperazine-1-carboxylate 79% C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.23 (d, $J=9\text{Hz}$, 2H), 7.79-7.76 (m, 2H), 7.65-7.57 (m, 3H), 7.24(d, $J=9\text{Hz}$, 2H), 3.77-3.68(m, 4H), 3.13-3.10 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{17}\text{H}_{17}\text{N}_3\text{O}_6\text{S}$, 392.091; found, 392.0913.

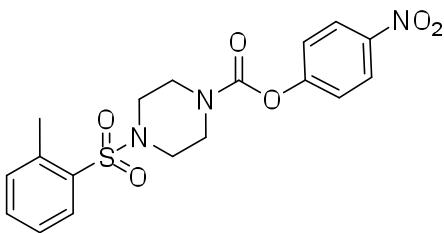


234: 4-nitrophenyl 4-tosylpiperazine-1-carboxylate 81% C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.23 (d, $J=9\text{Hz}$, 2H), 7.67-7.65 (m, 2H), 7.38-7.35 (m, 2H), 7.24(d, $J=9\text{Hz}$, 2H), 3.78-3.68(m, 4H), 3.11-3.09 (m, 4H), 2.46 (s, 3H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{19}\text{N}_3\text{O}_6\text{S}$, 406.1067; found, 406.1067.



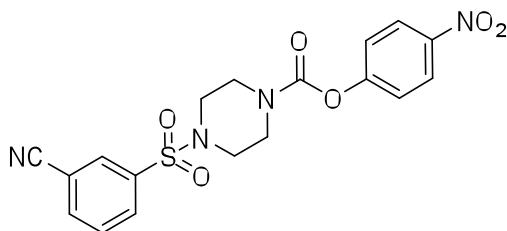
235: 4-nitrophenyl 4-(4-tert-butylphenylsulfonyl)piperazine-1-carboxylate

74% C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.24 (d, $J=9\text{Hz}$, 2H), 7.71-7.69 (m, 2H), 7.58-7.56 (m, 2H), 7.25 (d, $J=9\text{Hz}$, 2H), 3.79-3.68 (m, 4H), 3.12-3.10 (m, 4H), 1.36 (s, 9H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{25}\text{N}_3\text{O}_6\text{S}$, 448.1536; found, 448.1539.



236: 4-nitrophenyl 4-(o-tolylsulfonyl)piperazine-1-carboxylate 75% C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25 (d, $J=9\text{Hz}$, 2H), 7.72-7.68 (m, 2H), 7.42-7.38 (m, 2H), 7.25(d, $J=9\text{Hz}$, 2H), 3.78-3.66(m, 4H), 3.14-3.11 (m, 4H), 2.66 (s, 3H).

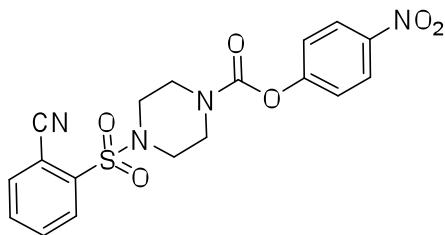
HRMS (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{18}\text{H}_{19}\text{N}_3\text{O}_6\text{S}$, 406.1067; found, 406.1069.



237: 4-nitrophenyl 4-(3-cyanophenylsulfonyl)piperazine-1-carboxylate 79%

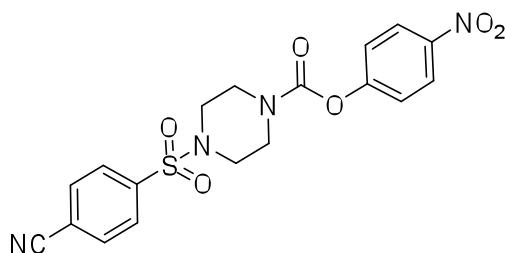
C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.25 (d, $J=9\text{Hz}$, 2H), 7.08-7.93 (m, 3H), 7.76-

7.73 (m, 1H), 7.26(d, J=9Hz, 2H), 3.82-3.72(m, 4H), 3.17 (s, 4H). **HRMS** (m/z): $[M+H]^+$ calculated for $C_{18}H_{16}N_4O_6S$, 417.0863; found, 417.0868.



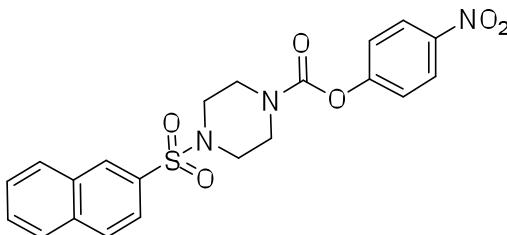
238: 4-nitrophenyl 4-(2-cyanophenylsulfonyl)piperazine-1-carboxylate 78%

C 1H -NMR (600 MHz, $CDCl_3$): δ 8.26 (d, J=9Hz, 2H), 8.10-8.08 (m, 1H), 7.92-7.91 (m, 1H), 7.81-7.76 (m, 2H), 7.27(d, J=9Hz, 2H), 3.82-3.70(m, 4H), 3.44-3.35 (m, 4H). **HRMS** (m/z): $[M+H]^+$ calculated for $C_{18}H_{16}N_4O_6S$, 417.0863; found, 417.0863.



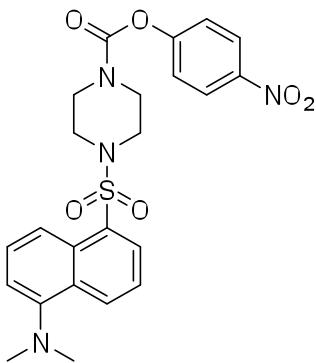
239: 4-nitrophenyl 4-(4-cyanophenylsulfonyl)piperazine-1-carboxylate 81%

C 1H -NMR (600 MHz, $CDCl_3$): δ 8.24 (d, J=9Hz, 2H), 7.90-7.89 (m, 4H), 7.25 (d, J=9Hz, 2H), 3.80-3.70(m, 4H), 3.18-3.16 (m, 4H). **HRMS** (m/z): $[M+H]^+$ calculated for $C_{18}H_{16}N_4O_6S$, 417.0863; found, 417.0869.



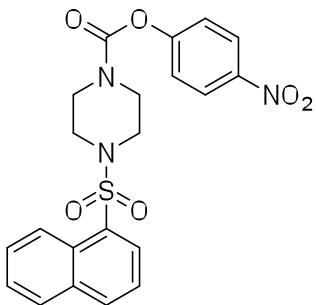
240: 4-nitrophenyl 4-(naphthalen-2-ylsulfonyl)piperazine-1-carboxylate 75%

C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.21 (d, $J=9\text{Hz}$, 2H), 8.02-7.94 (m, 3H), 7.77-7.67 (m, 3H), 7.21 (d, $J=9\text{Hz}$, 2H), 3.79-3.69(m, 4H), 3.20-3.17 (m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{19}\text{N}_3\text{O}_6\text{S}$, 442.1067; found, 442.0162.



241: 4-nitrophenyl 4-(5-(dimethylamino)naphthalen-1-ylsulfonyl)piperazine-

1-carboxylate 71% C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.61-8.59 (m, 1H), 8.40-8.38 (m, 1H), 8.25-8.20 (m, 3H), 7.58-7.54 (m, 2H), 7.23-7.21 (m, 3H), 3.73-3.62 (m, 4H), 3.29(s, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{23}\text{H}_{24}\text{N}_4\text{O}_6\text{S}$, 485.1489; found, 485.1482.



242: 4-nitrophenyl 4-(naphthalen-1-ylsulfonyl)piperazine-1-carboxylate 72%

C $^1\text{H-NMR}$ (600 MHz, CDCl_3): δ 8.49-8.47 (m, 1H), 8.26-8.20 (m, 3H), 8.14-8.11 (m, 1H), 7.98-7.96 (m, 1H), 7.69-7.59 (m, 3H), 7.22-7.20 (m, 2H), 3.73-3.62 (m, 4H), 3.29-3.28(m, 4H). **HRMS** (m/z): $[\text{M}+\text{H}]^+$ calculated for $\text{C}_{21}\text{H}_{19}\text{N}_3\text{O}_6\text{S}$, 442.1067; found, 442.1065.

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Supplementary Figure Legends.

Table S1. Spectral count values for metabolic serine hydrolase (SHs) identified in individual ABPP-MudPIT experiments performed across the entire mouse cell/tissue panel. ABPP-MudPIT experiments were performed as described previously(25). Each cell/tissue was analyzed in at least three independent ABPP-MudPIT experiments and the data averaged and normalized to the cell/tissue expressing the highest signals for each SH to give the profile shown in Figure 1B. np, no probe control reactions.

Table S2. List of 72-member SH panel screened by library-versus-library competitive ABPP. Also listed are the Ensemble ID numbers for each enzymes, as well as the source of the enzyme (recombinant or native) used for screening.

Table S3. List of all primary hit carbamates (lacking the WWL prefix to conserve space) that inhibited $\geq 75\%$ FP-rhodamine labeling in the primary screen.

Fig. S1. Structures of fluorophosphonate-rhodamine (FP-rhodamine) and fluorophosphonate-biotin (FP-biotin) probes.

Fig. S2. Representative fluorophosphonate (FP)-rhodamine labeling profiles for cellular fractions from the mouse macrophage cell line RAW264.7. Boxed in red

are signals for the SH lipoprotein lipase (LPL), which is highly expressed in the conditioned media of RAW264.7 cells. This proteomic fraction was used as the source for LPL in the library-versus-library screen.

Fig. S3. A dendrogram of the mouse metabolic SH family, where enzymes that were screened as part of library-versus-library competitive ABPP study are colored blue. Note that representative enzymes from most of the major branches of the SH family were screened.

Fig. S4. Primary competitive ABPP screening data for the entire 72-member SH panel. Most of the enzymes (64) were screened as recombinant proteins in crude (or partially purified) proteomes from transfected cells. In these cases, mock (empty vector-transfected) and DMSO control lanes are shown. Two enzymes (PAFAH1B2, PAFAH1B3) were screened as recombinant proteins expressed in *E. coli*. These enzymes were doped back into mammalian cell proteomes and therefore mock lanes correspond to proteomes lacking the doped enzyme. Certain enzymes (PLA1A, BCHE, SIAE, LPL, CTSA, FAS) were screened from native sources, such as the conditioned media of cell lines, and, in these cases, proteomes were treated (post-screening) with PNGaseF to deglycosylate enzymes and improve their resolution on SDS-PAGE. Control lanes lacking PNGaseF are provided for comparison. In cases where the screened SH migrated close to another endogenous or screened SH, we marked the screened enzymes with a red box. A ‘control hydrolase’ is shown for each profile, which

corresponds to an FP-labeled SH endogenously expressed by the transfected mammalian cell proteome.

Fig. S5. Concentration-dependent inhibition profiles for representative carbamate hits against the SHs AADAC (A), AADACL1 (B), ABHD2 (C), ABHD6 (D), ABHD11 (E), ACHE (F), BCHE (G), CEL (H), FAAH (I), FAAH2 (J), PLA2G7 (K), and PNPLA8 (L). (M) Concentration-dependent inhibition profiles for WWL38 showing preferential inhibition of AADACL1 and ACHE over the AADACL1-sequence homolog AADAC. For each profile, a representative competitive ABPP gel is shown above the concentration-dependent inhibition plot, which was derived from three independent experiments. Data are presented as means \pm standard error of the mean (SEM).

Fig. S6. WWL123 selectively inactivates ABHD6 *in vivo*. (A) Gel-based ABPP profiles of SHs from the brain membrane proteomes of mice treated with vehicle or WWL123 (5, 10, or 20 mg kg⁻¹, intraperitoneally, 4 h) reveals selective inhibition of ABHD6. (B) ABPP-MudPIT analysis of SHs from mouse membrane proteomes of mice treated with vehicle or WWL123 (20 mg kg⁻¹, intraperitoneally, 4h) confirms that only ABHD6 was inhibited by WWL123 among the ~35 SHs detected (* $p < 0.01$). Data are presented as means \pm standard error of the mean (SEM); n = 3/group.

Table S1. See accompanying Excel file.

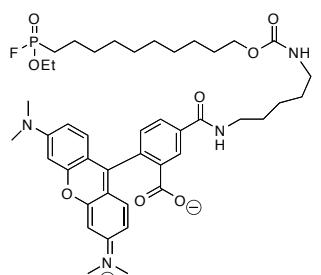
Table S2. See accompanying Excel file.

Table S3

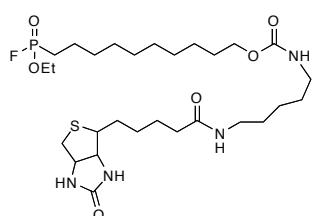
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AADAC	215
AADACL1	38, 39, 57, 61, 66
ABHD11	34, 62, 68, 98, 102, 151, 154, 156, 162, 164, 202, 215, 216, 219, 220, 221, 222, 223, 226, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242
ABHD2	110
ABHD6	97, 98, 101, 103, 111, 112, 113, 115, 116, 117, 118, 119, 123, 126, 130, 154, 170, 202, 203, 204, 205, 206, 215, 218, 220, 226, 233, 234, 236
ACHE	38, 52, 66
APEH	216, 217
AU018778	URB597, JZL184, 18, 38, 52, 56, 72, 88, 92, 95, 96, 97, 98, 100, 101, 102, 103, 106, 107, 108, 110, 111, 112, 113, 115, 116, 117, 118, 119, 123, 130, 155, 162, 163, 164, 201, 202, 203, 204, 205, 206, 208, 212, 213, 214, 221, 225
BC015286	JZL184, 11, 18, 22, 23, 24, 37, 59, 65, 88, 97, 98, 111, 112, 115, 130, 152, 153, 154, 156, 162, 170, 202, 204, 205, 206, 208, 218, 220, 221, 226, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242
BCHE	97, 101, 105, 106, 110, 111, 112, 118
CEL	92, 98, 107, 101, 110, 111, 112, 115, 117, 118, 130, 205, 206
CES1	38, 50, 52, 56, 79, 94, 107, 115, 119, 123, 130, 151, 209, 210, 211, 215, 216, 219, 220
CES2	URB597, 12, 15, 16, 18, 20, 22, 23, 24, 56, 69, 92, 97, 98, 101, 102, 103, 106, 107, 108, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 122, 123, 125, 126, 127, 130, 151, 155, 201, 202, 204, 205, 206, 208, 209, 210, 211, 214, 215, 216, 217, 220, 221, 222, 227, 230, 231, 234, 235, 237, 239
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CES6	URB397, JZL184, 15, 16, 17, 18, 20, 22, 23, 24, 25, 28, 30, 31, 33, 35, 36, 37, 38, 50, 52, 53, 54, 55, 56, 57, 61, 65, 76, 79, 80, 88, 92, 94, 95, 98, 101, 105, 110, 111, 113, 115,

CES6	URB397, JZL184, 15, 16, 17, 18, 20, 22, 23, 24, 25, 28, 30, 31, 33, 35, 36, 37, 38, 50, 52, 53, 54, 55, 56, 57, 61, 65, 76, 79, 80, 88, 92, 94, 95, 98, 101, 105, 110, 111, 113, 115, 116, 119, 121, 122, 123, 125, 126, 130, 151, 152, 153, 154, 170, 202, 203, 204, 205, 206, 208, 209, 210, 211, 212, 214, 215, 216, 218, 219, 220, 221, 222, 223, 226, 230, 231, 233, 234, 235, 236, 237, 238, 239, 240, 242
CPVL	115, 123, 154
DDHD1	104, 115, 121, 126, 127
ES1	6, 9, 11, 12, 18, 20, 22, 24, 25, 26, 33, 35, 38, 39, 44, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 59, 61, 66, 80, 88, 89, 92, 94, 95, 96, 97, 98, 101, 102, 103, 105, 106, 107, 114, 116, 117, 118, 119, 121, 122, 123, 127, 130, 154
ES22	JZL184, 22, 52, 56, 92, 94, 95, 97, 98, 101, 102, 103, 106, 107, 110, 111, 116, 117, 118, , 119, 123, 130, 170, 202, 203, 204, 205, 206, 208, 209, 210, 211, 213, 214, 221, 226
ES31	URB597, JZL184, 30, 34, 38, 39, 44, 53, 76, 92, 94, 102, 105, 106, 111, 112, 116, 118, 127, 130, 151, 154, 155, 173, 201, 202, 203, 204, 205, 206, 207, 208, 215, 216, 217, 218, 219, 220, 221, 222, 223, 226
FAAH	URB597, 16, 17, 22, 27, 23, 24, 51, 65, 94, 97, 98, 106, 107, 111, 112, 127, 130, 202, 203, 204, 205, 206, 208, 215, 219, 220, 221, 226, 233, 234, 236, 237, 238, 240, 242
FAAH2	URB597, 44, 55, 98, 105, 106, 112, 118, 127, 130, 154, 202, 208, 215, 220, 226
GM4738	JZL184, 11, 18, 22, 23, 24, 37, 59, 65, 88, 97, 98, 111, 112, 115, 130, 152, 153, 154, 156, 162, 170, 202, 204, 205, 206, 208, 218, 220, 221, 226, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242
LIPE	11
LYPLA3	233, 236, 237, 238
MGLL	JZL184, 98, 130, 152, 162, 170, 173, 202, 203, 204, 205, 206, 208, 218, 220, 233, 234, 235, 236
PLA2G6	103, 106
PLA2G7	98, 102, 103, 153, 154, 162, 202, 205, 206, 208, 215, 220, 221, 226, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242
PNPLA2	34, 64, 98, 130, 205, 206, 221

Fig. S1



FP-Rhodamine



FP-Biotin

Fig. S2

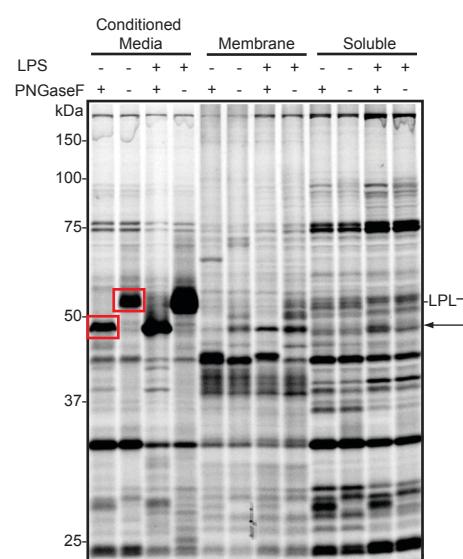


Fig. S3

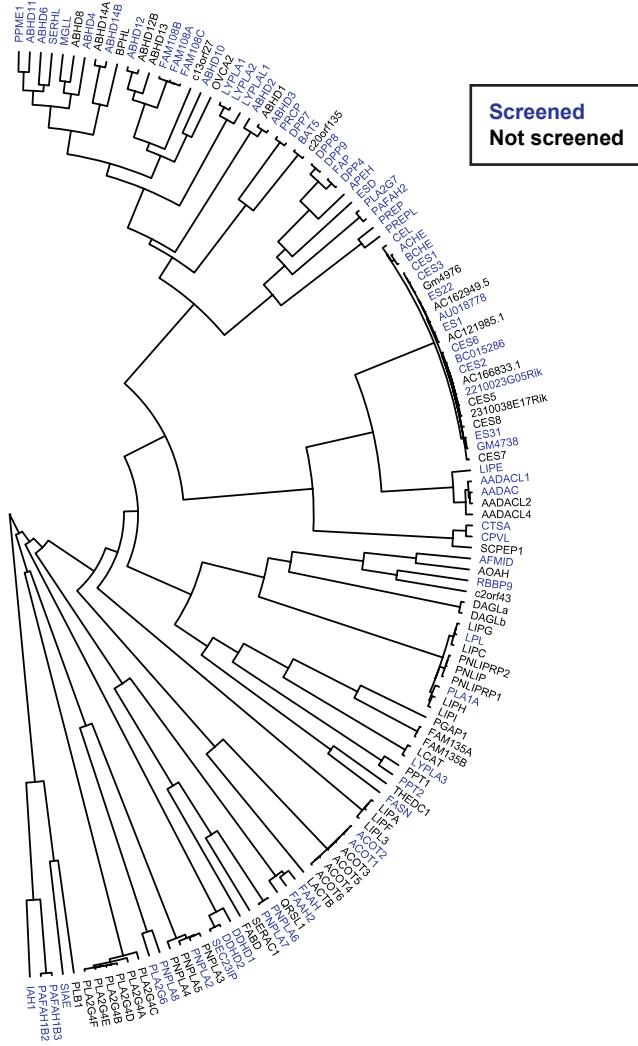
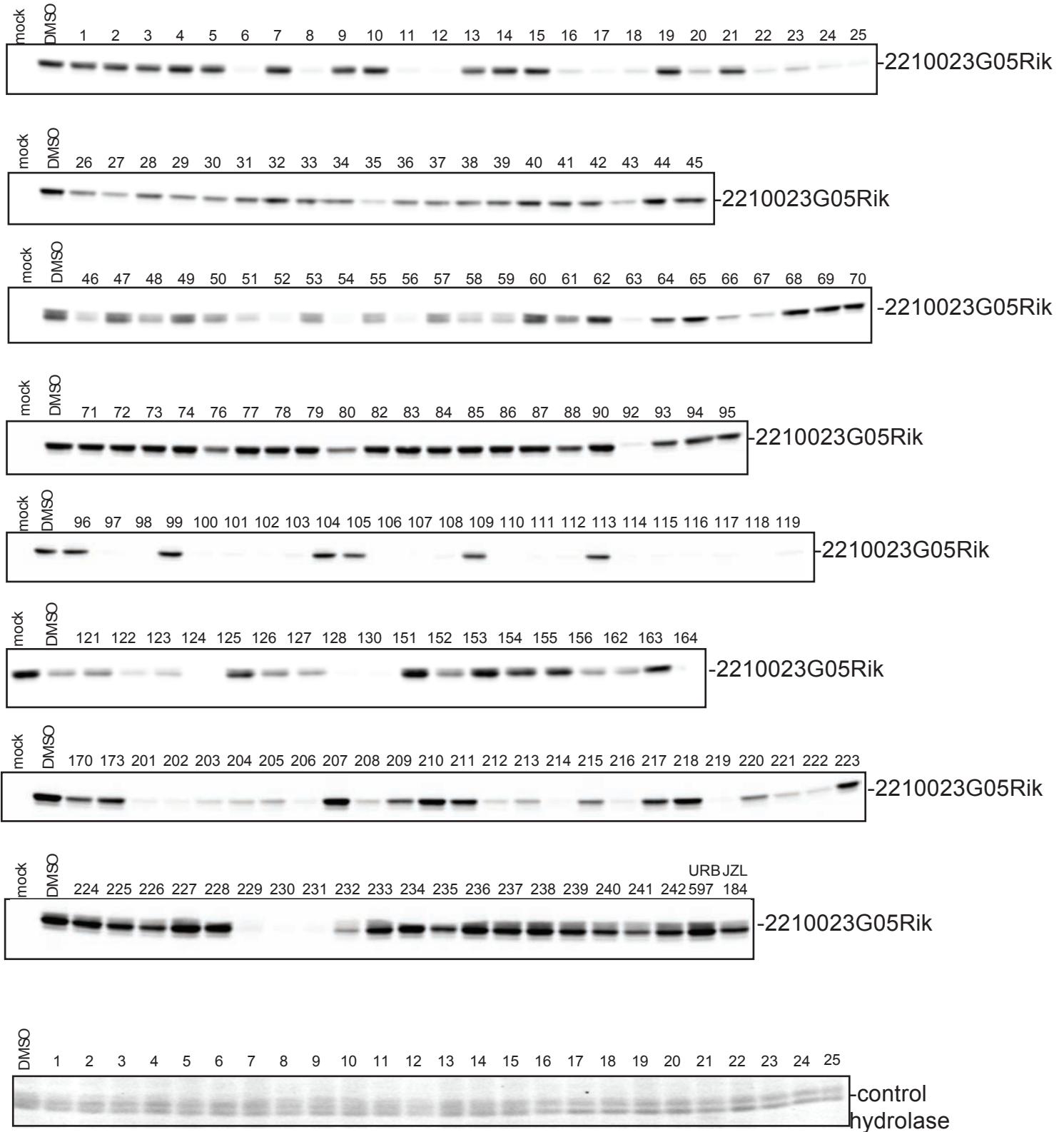


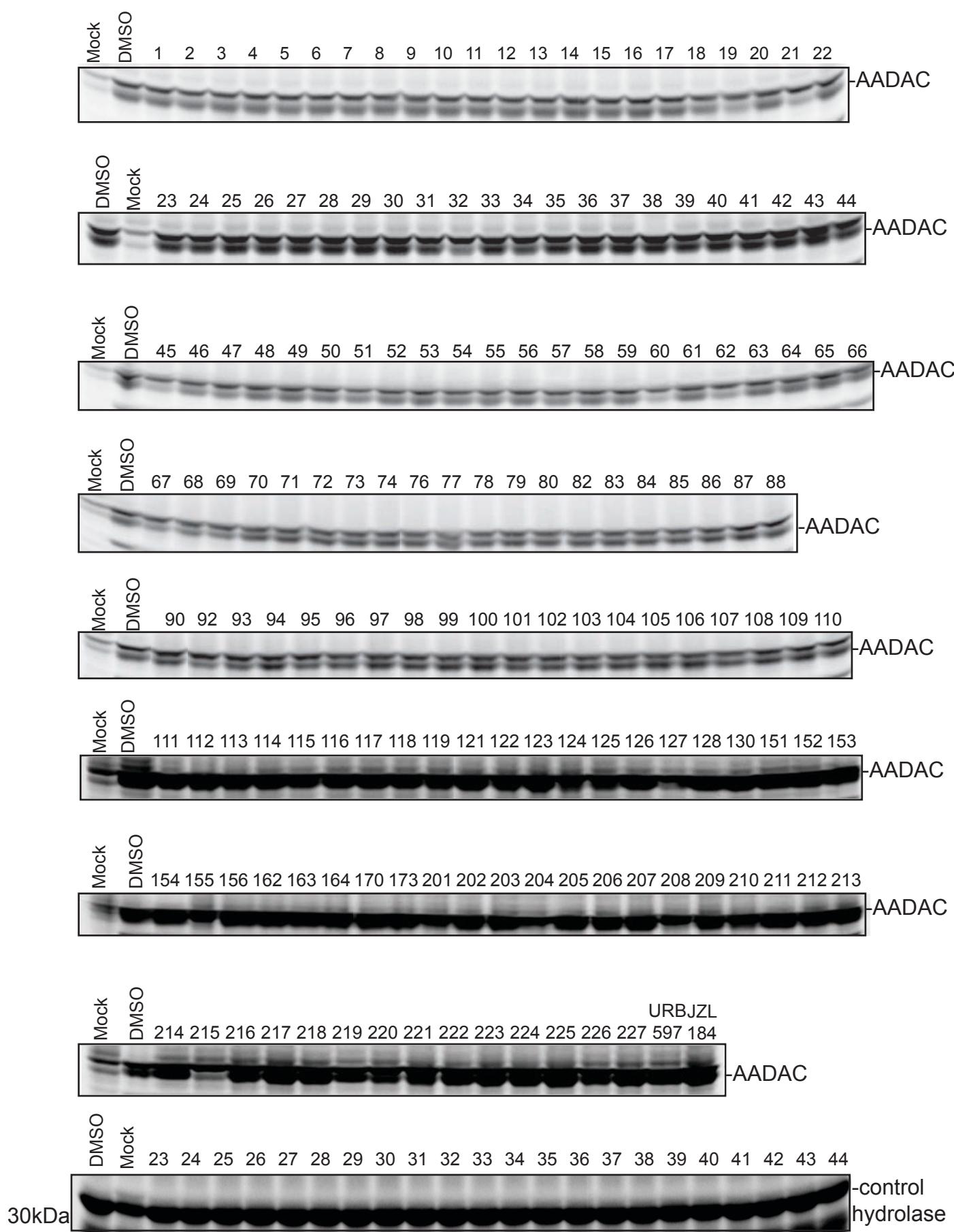
Fig. S4

PRIMARY SCREENING DATA FOR 72-SH PANEL

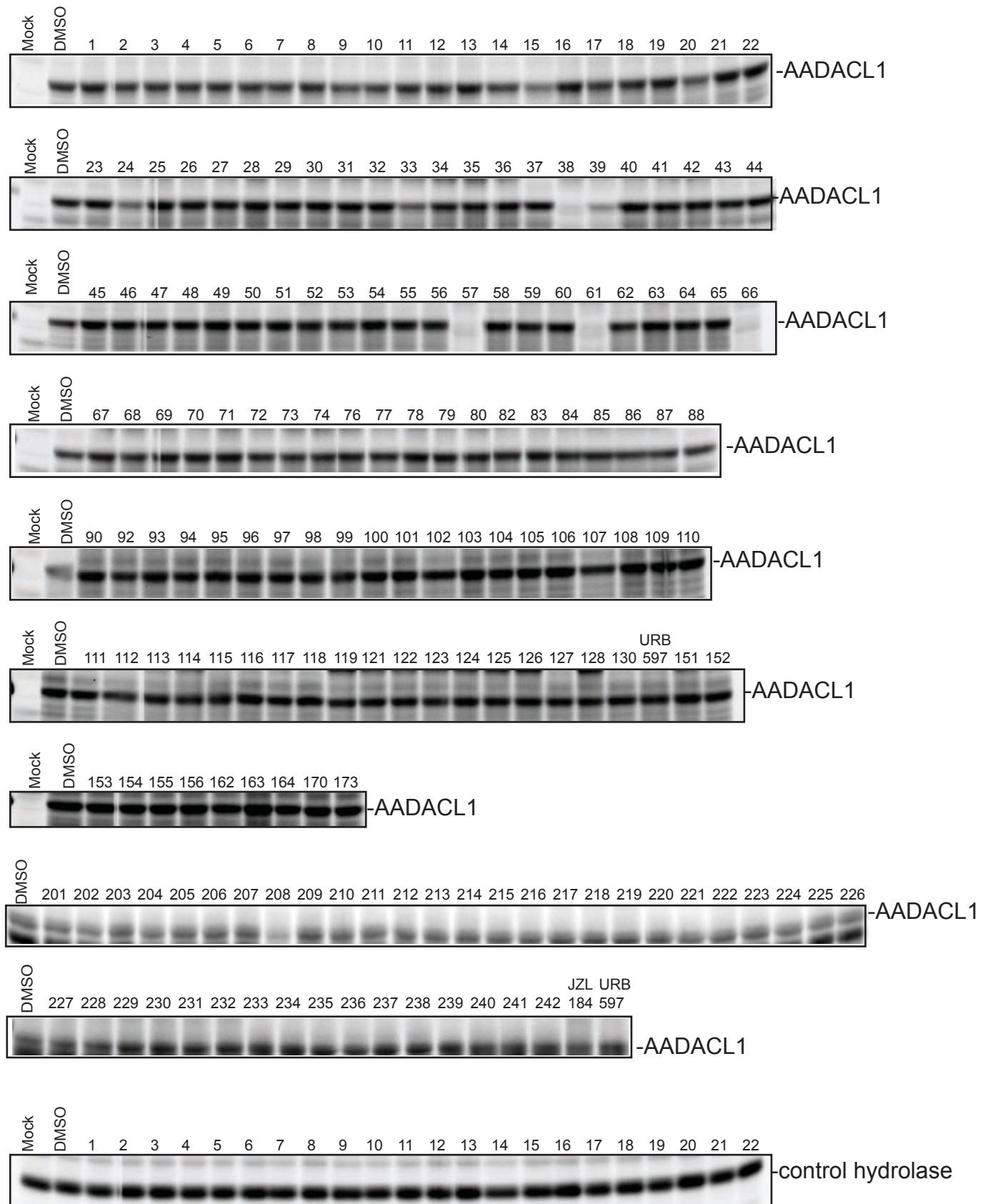
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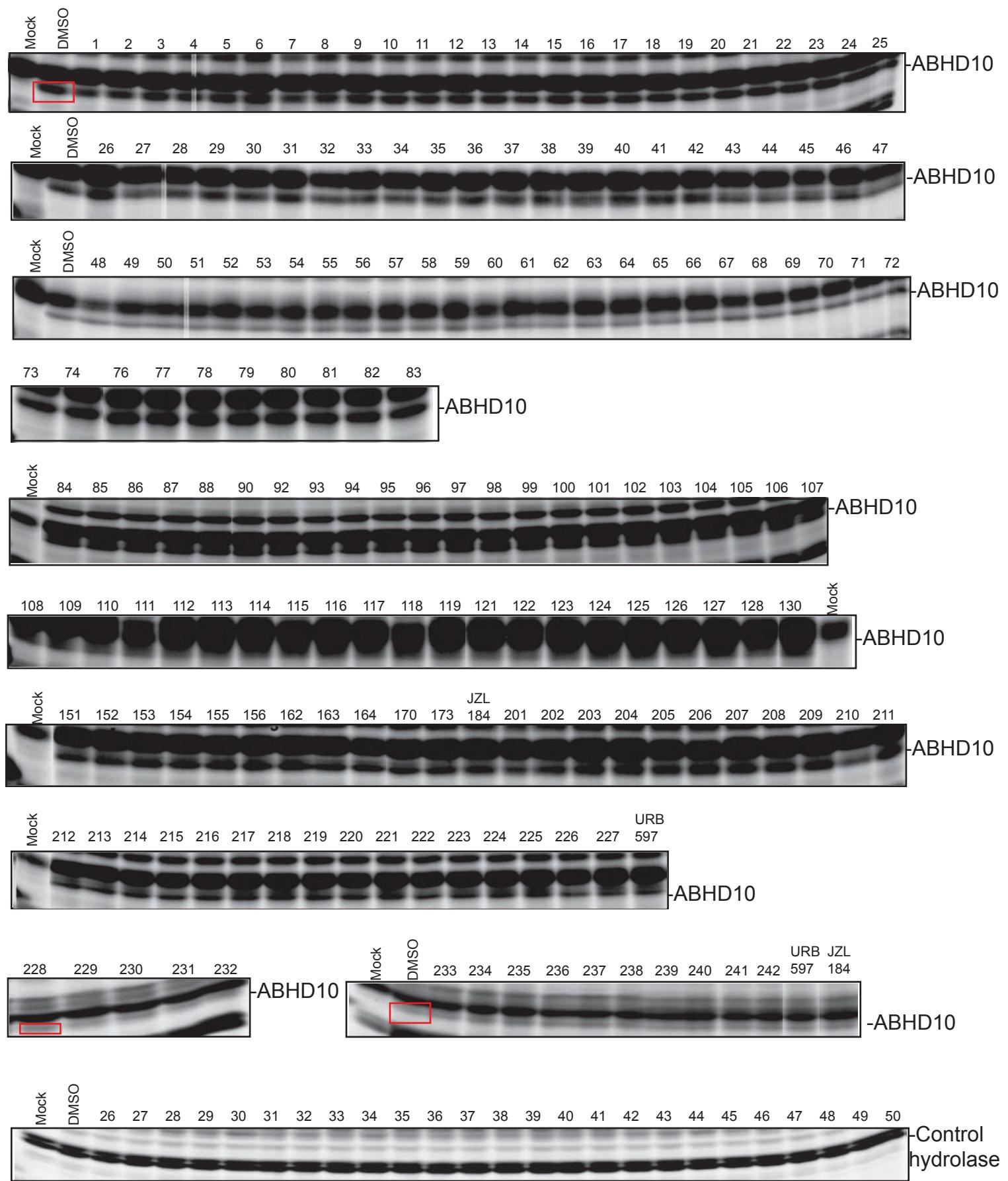
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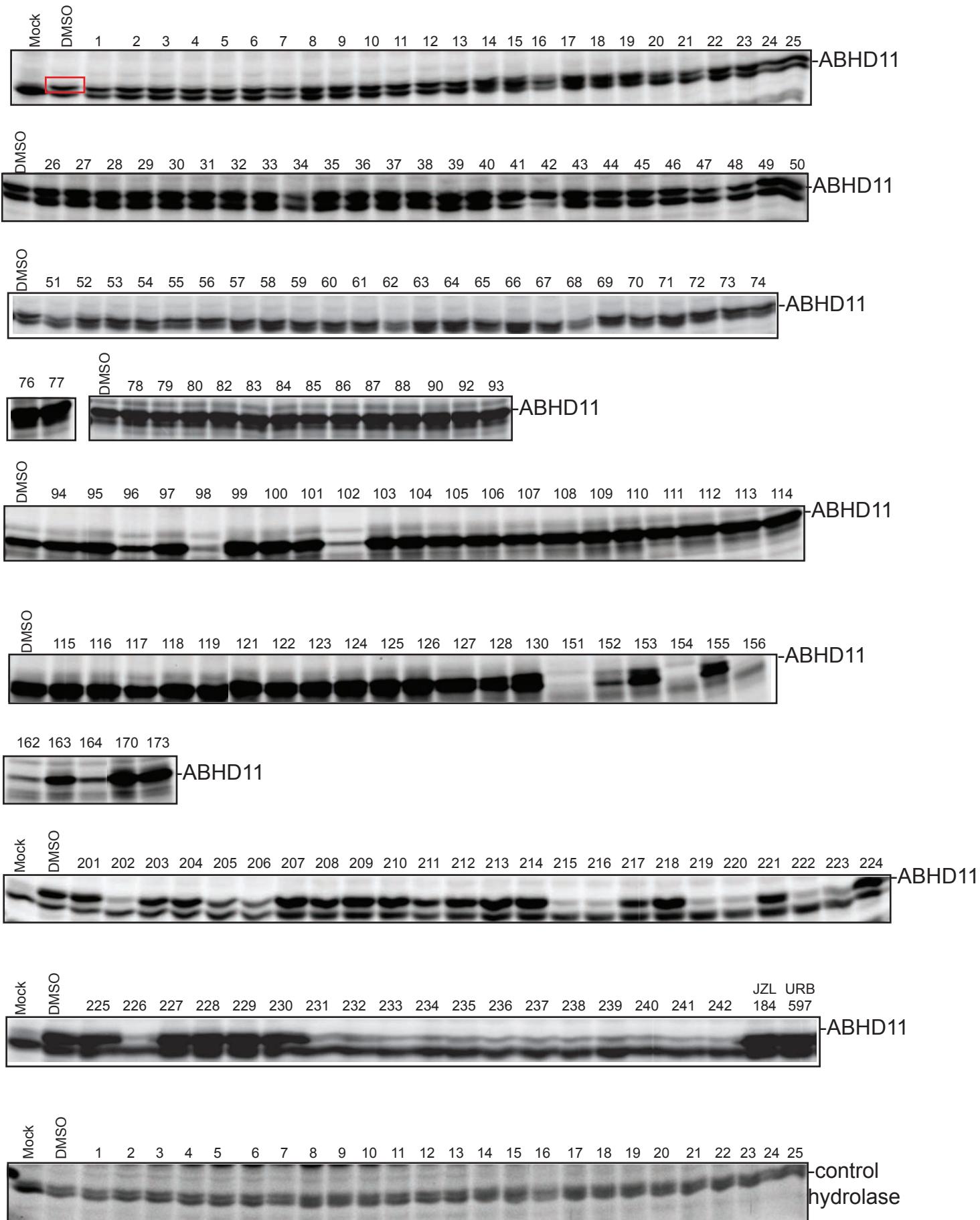
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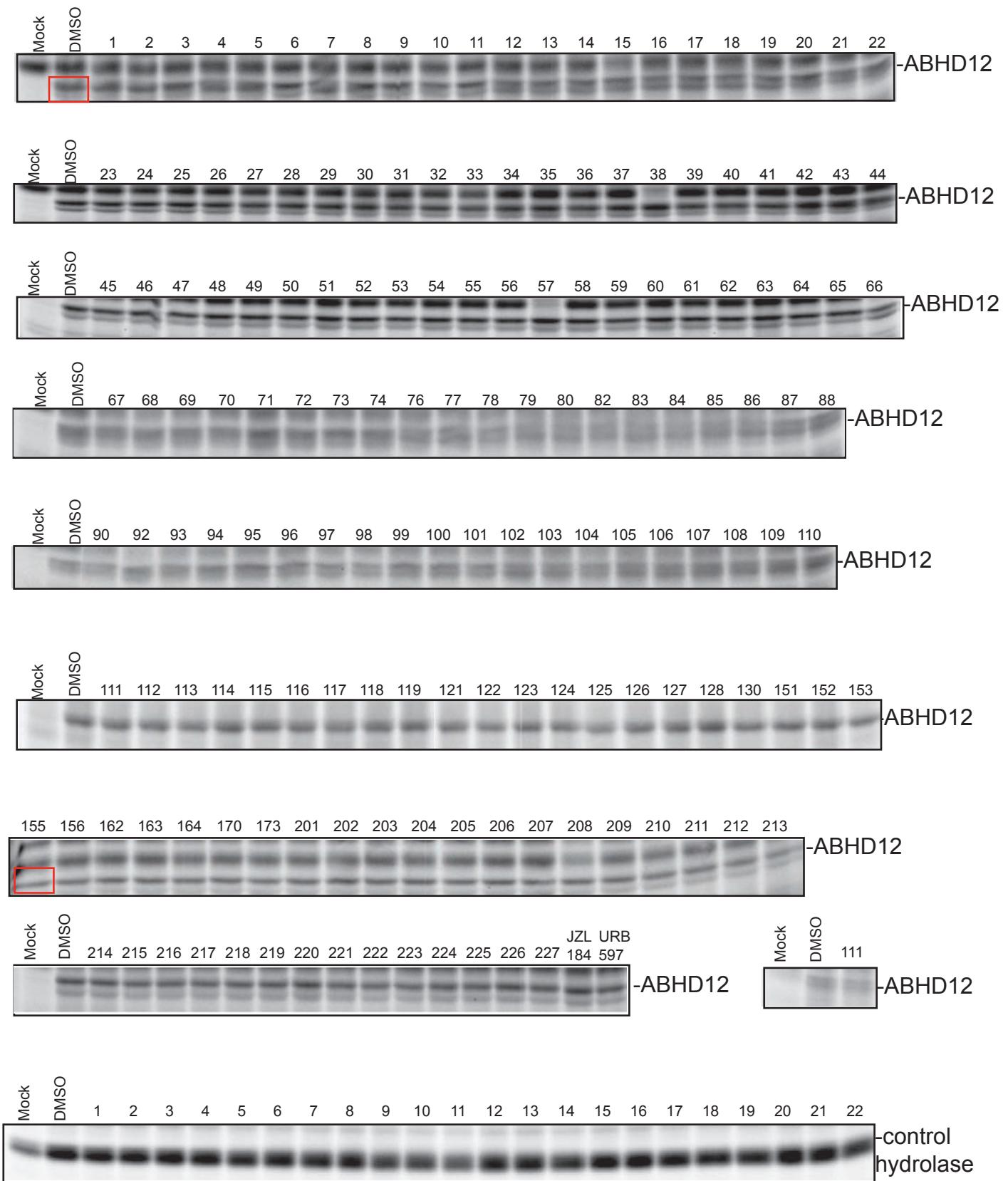
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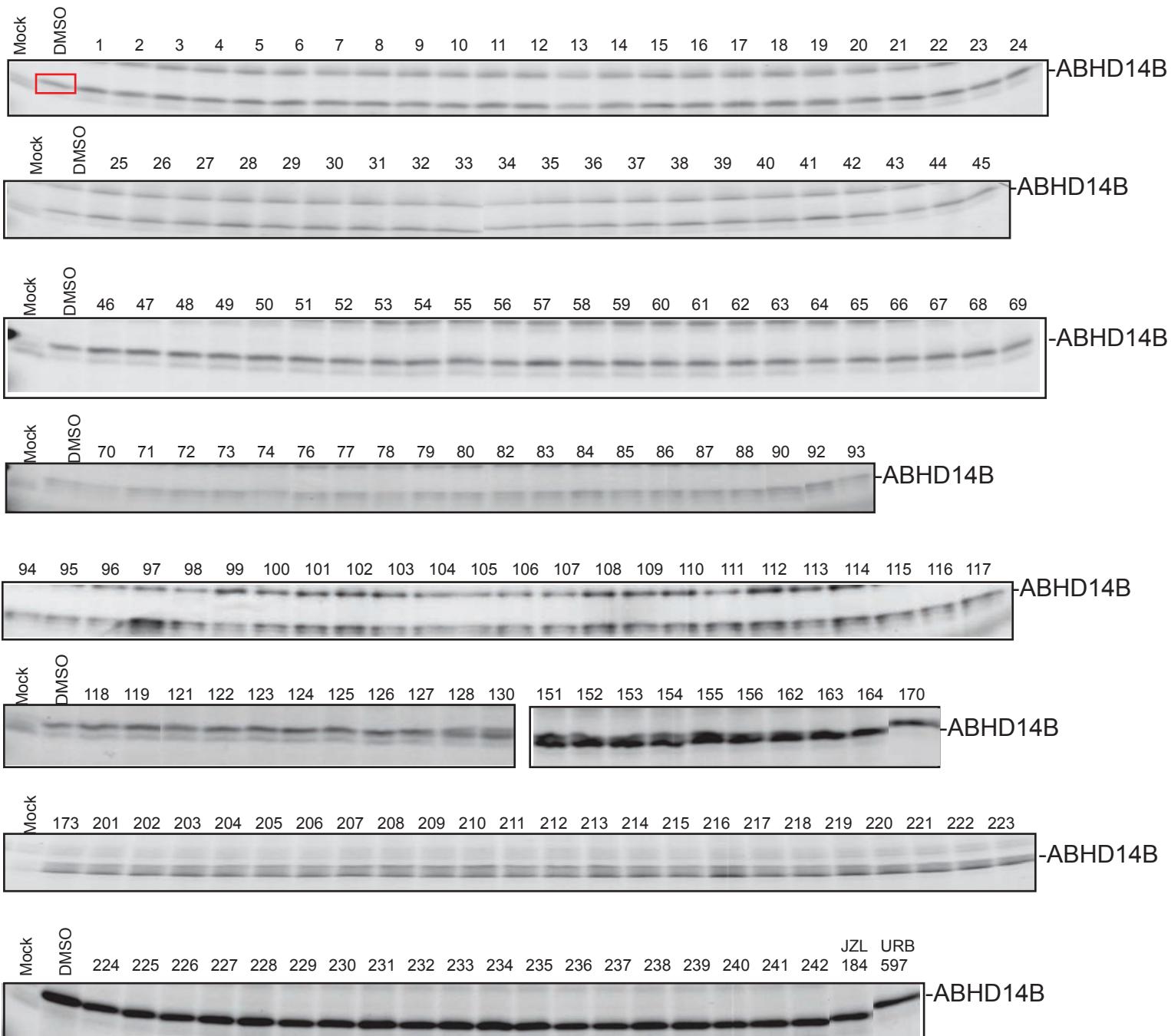
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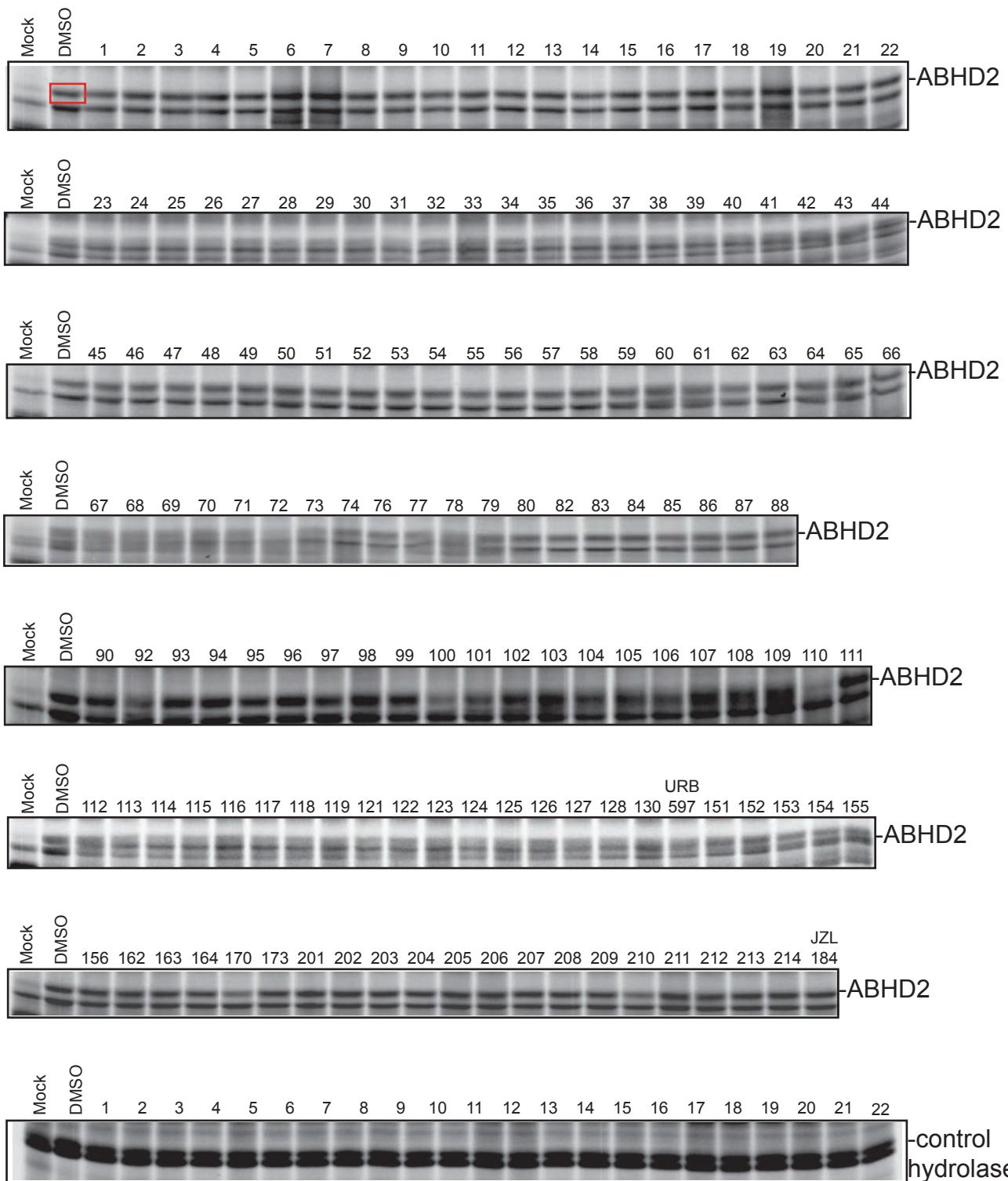
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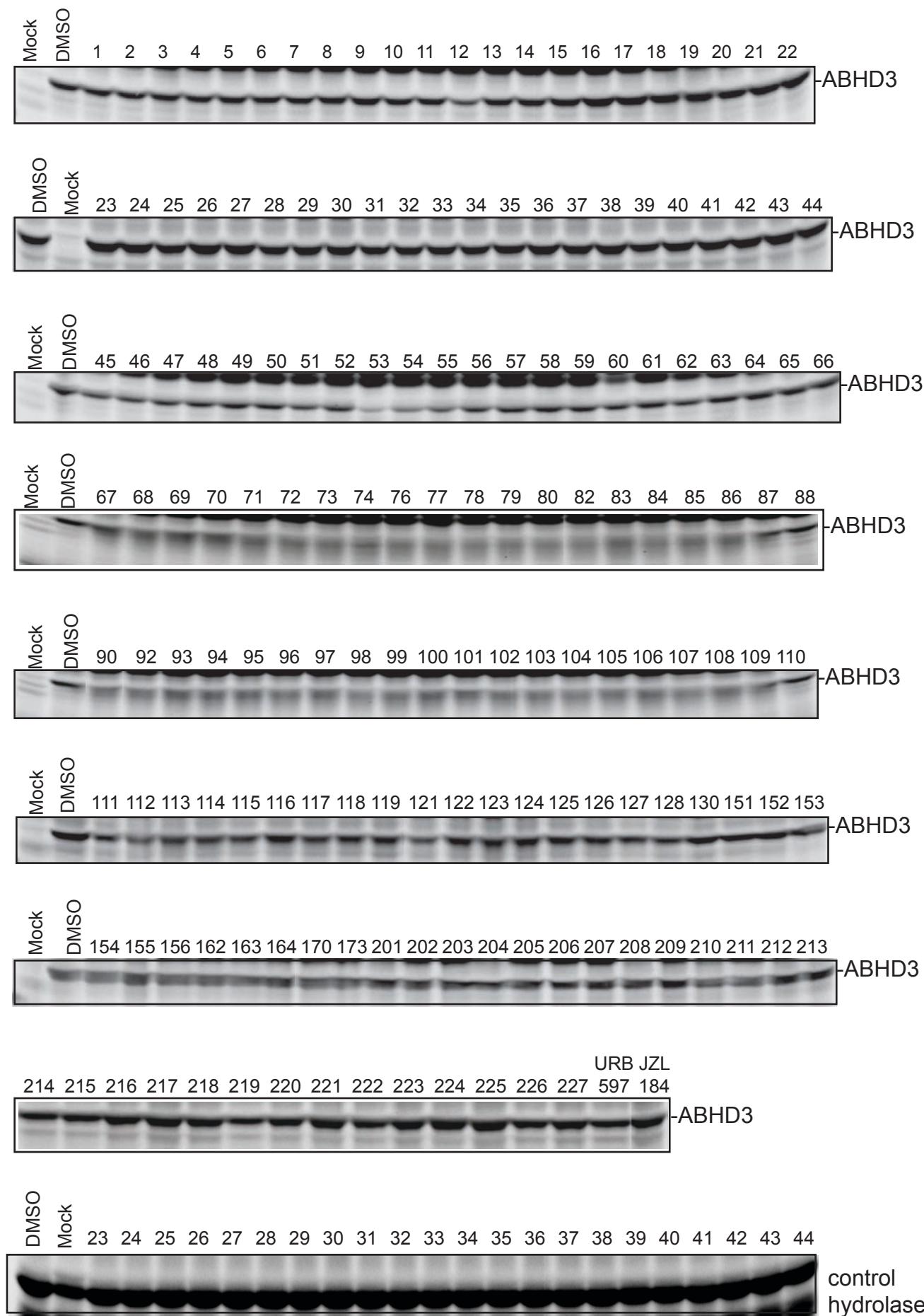
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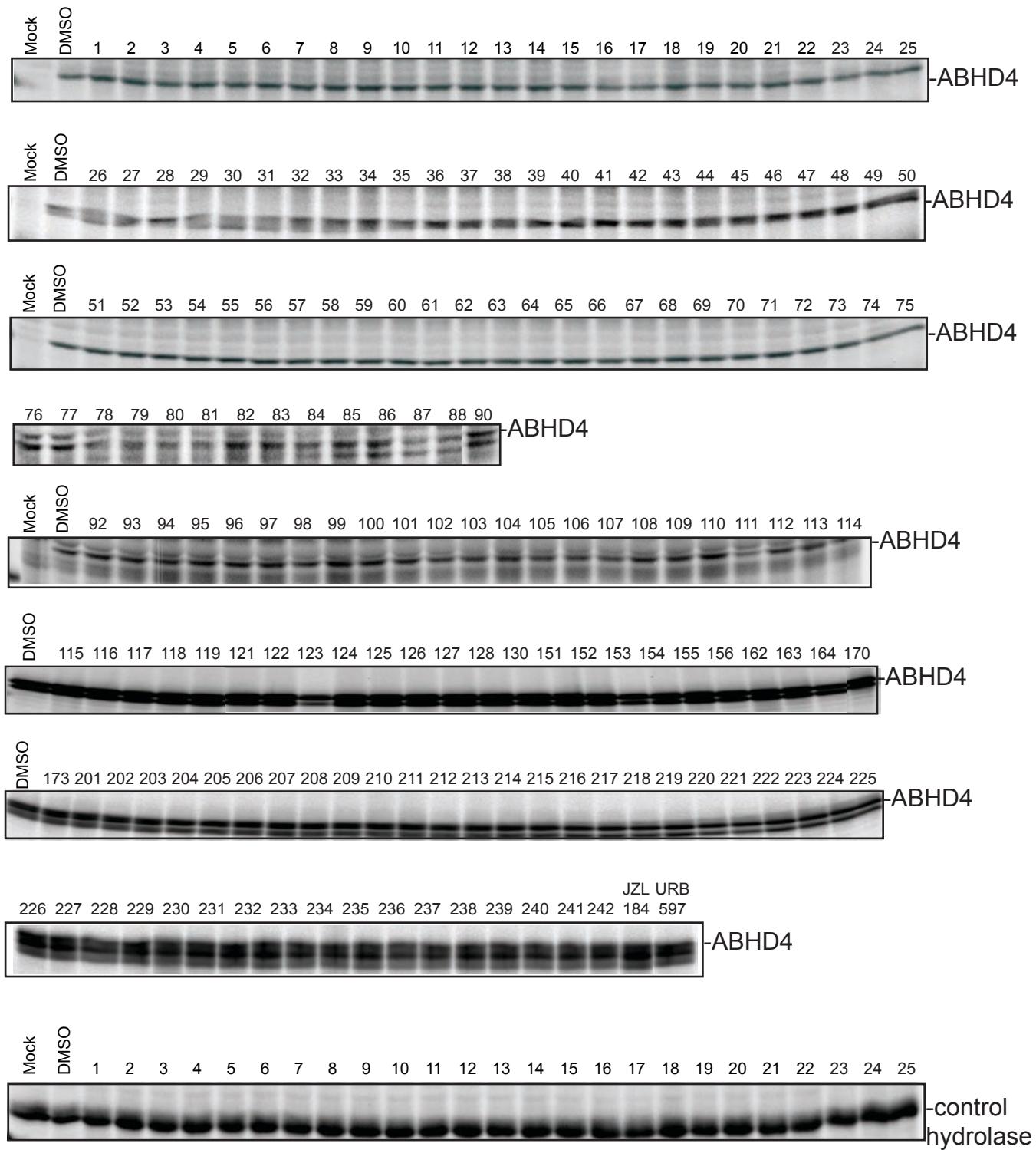
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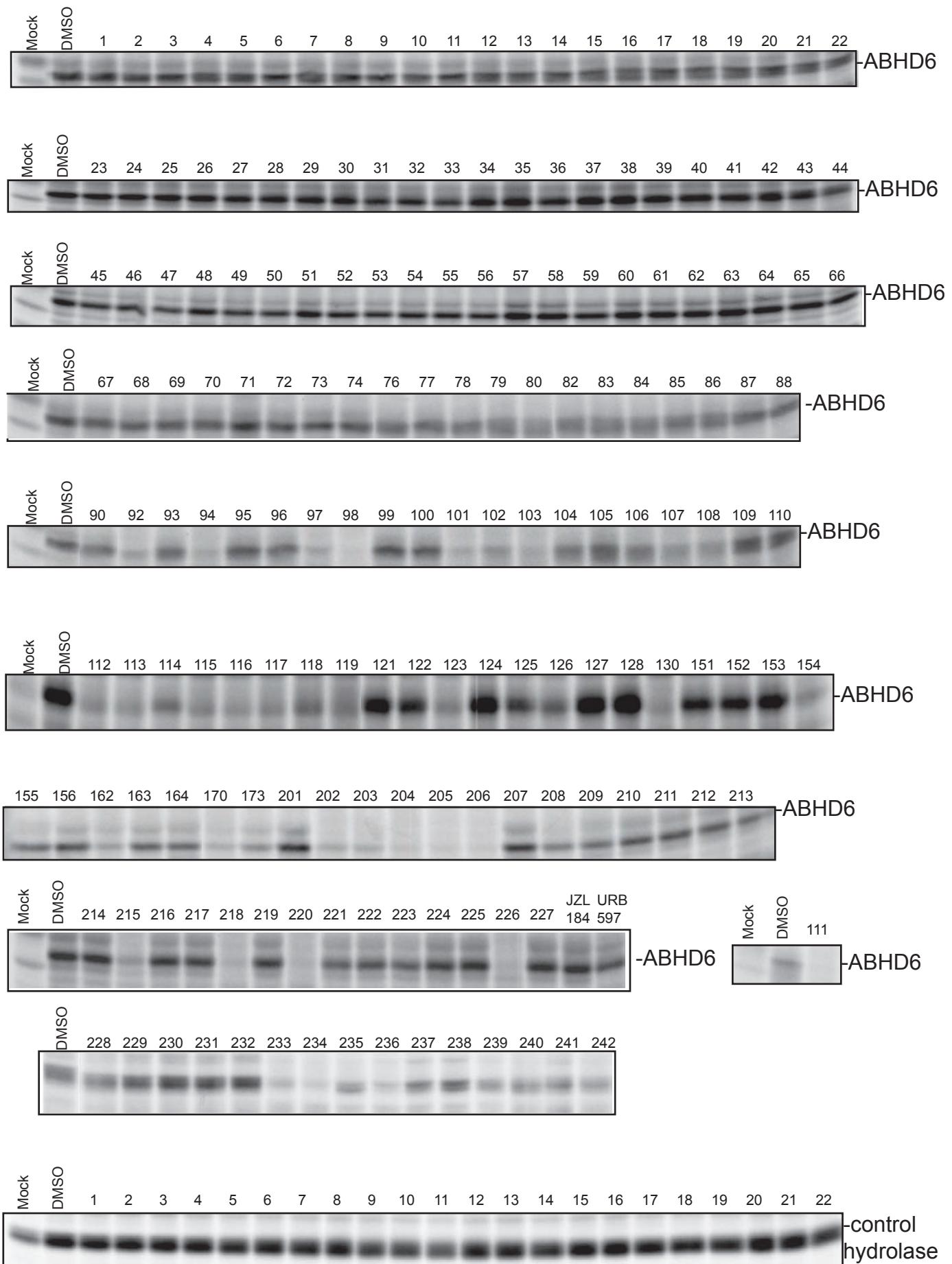
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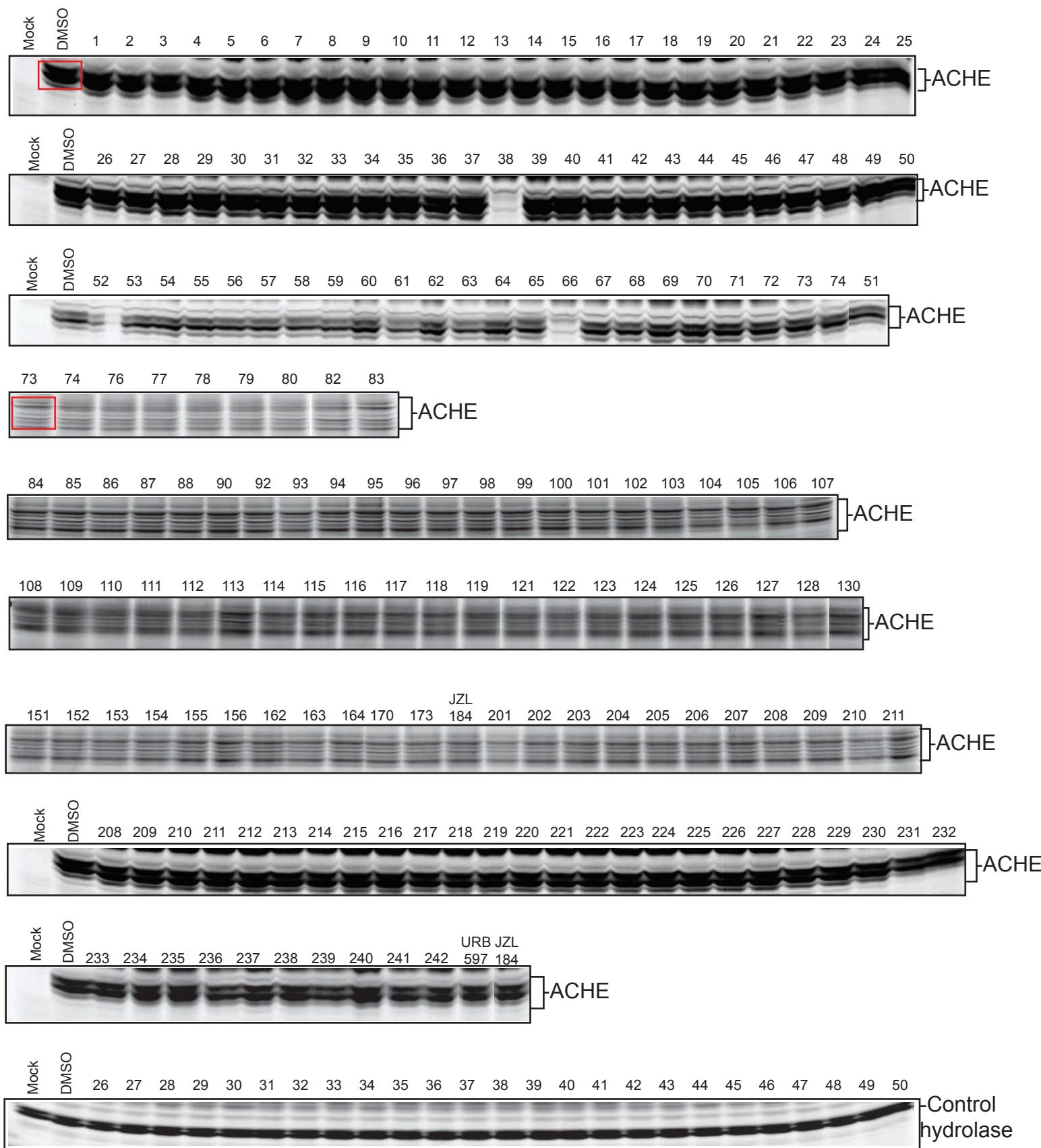
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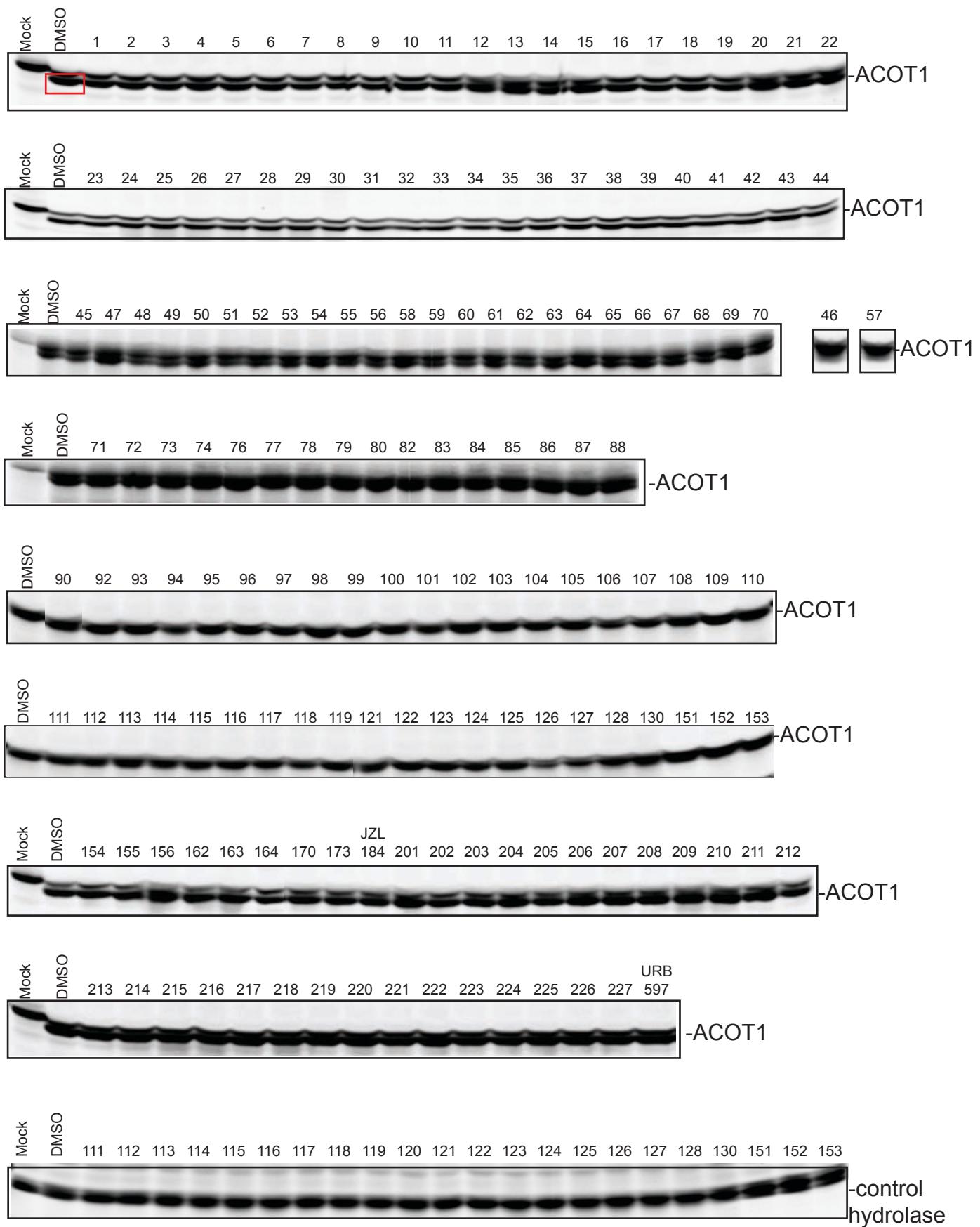
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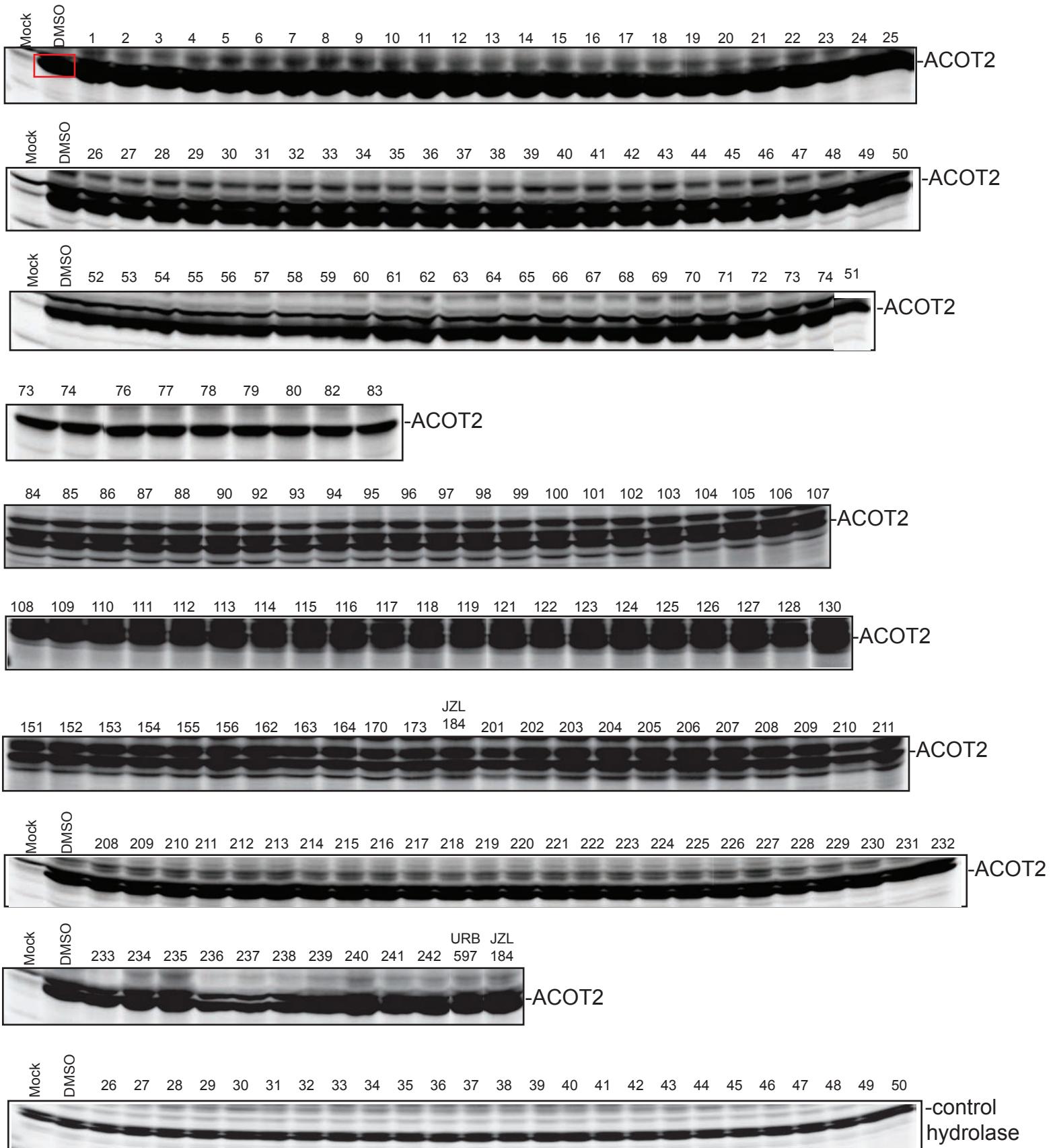
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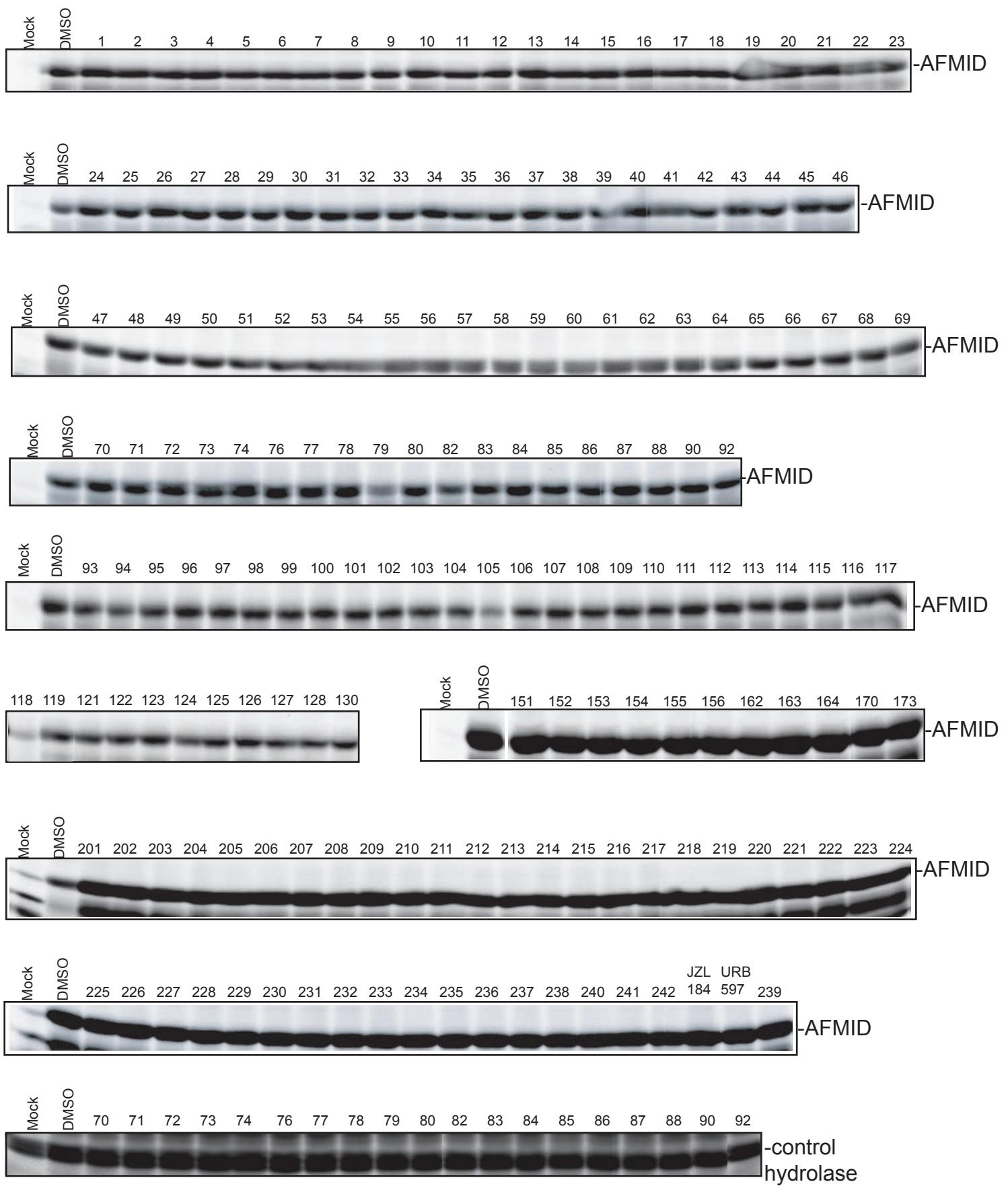
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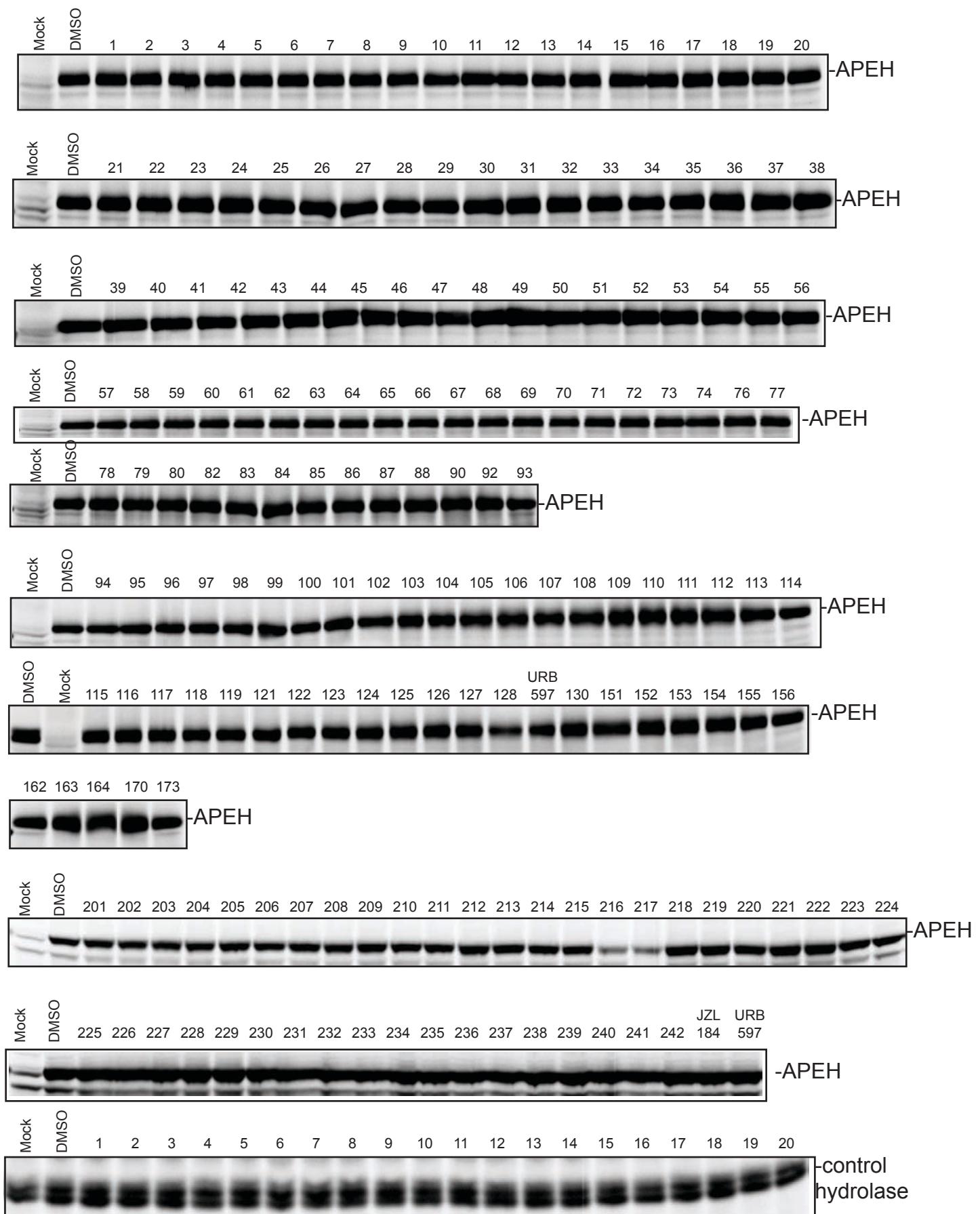
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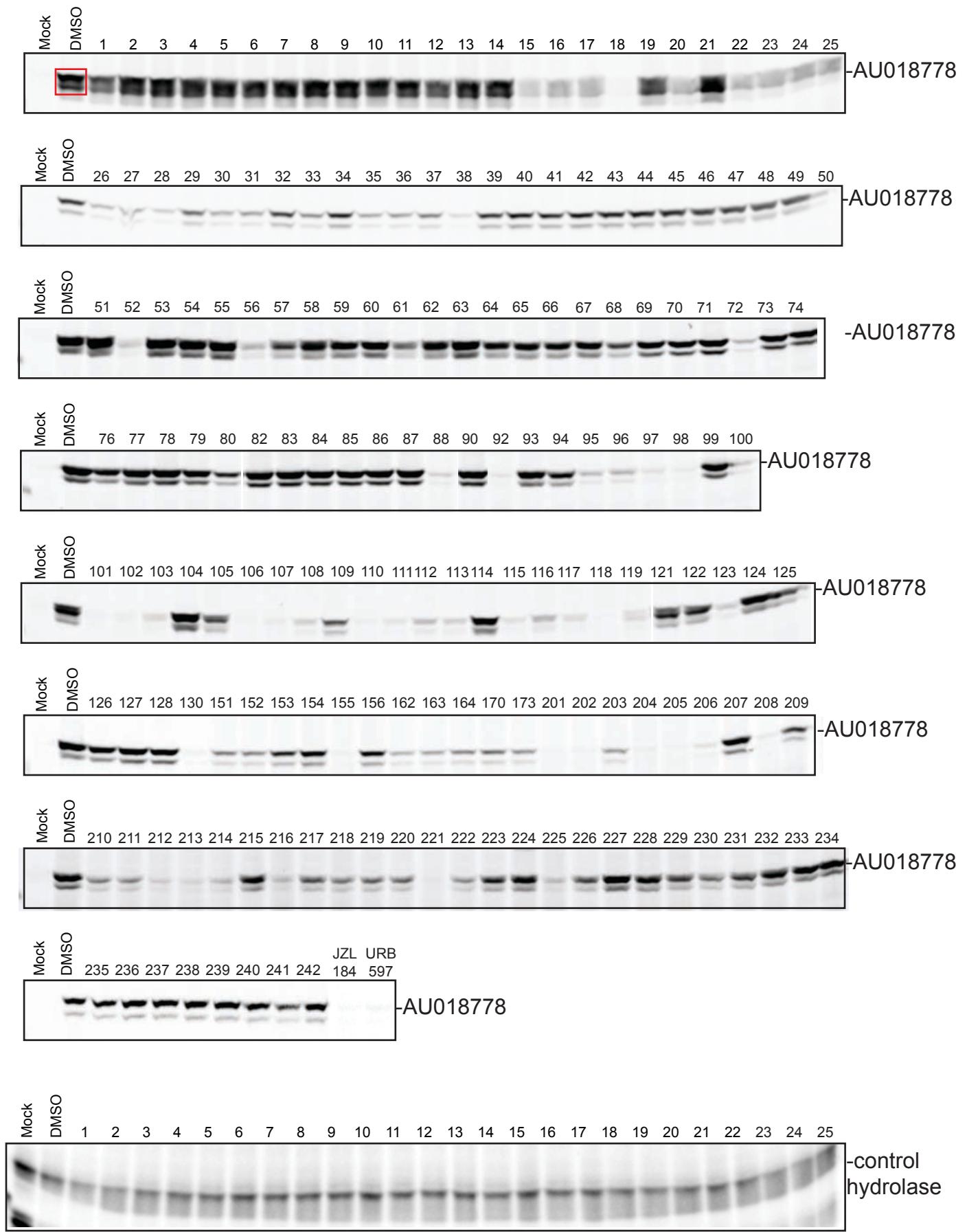
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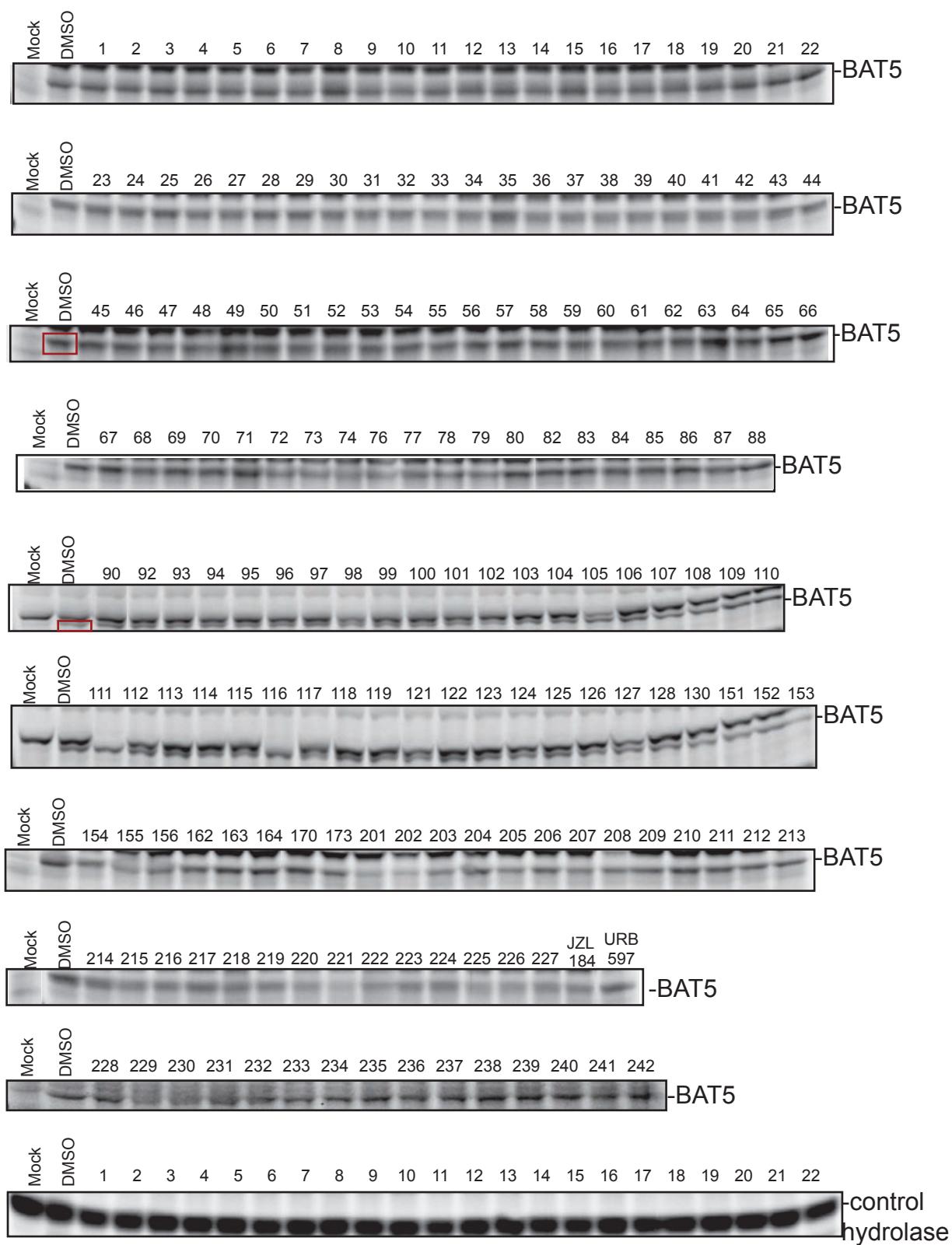
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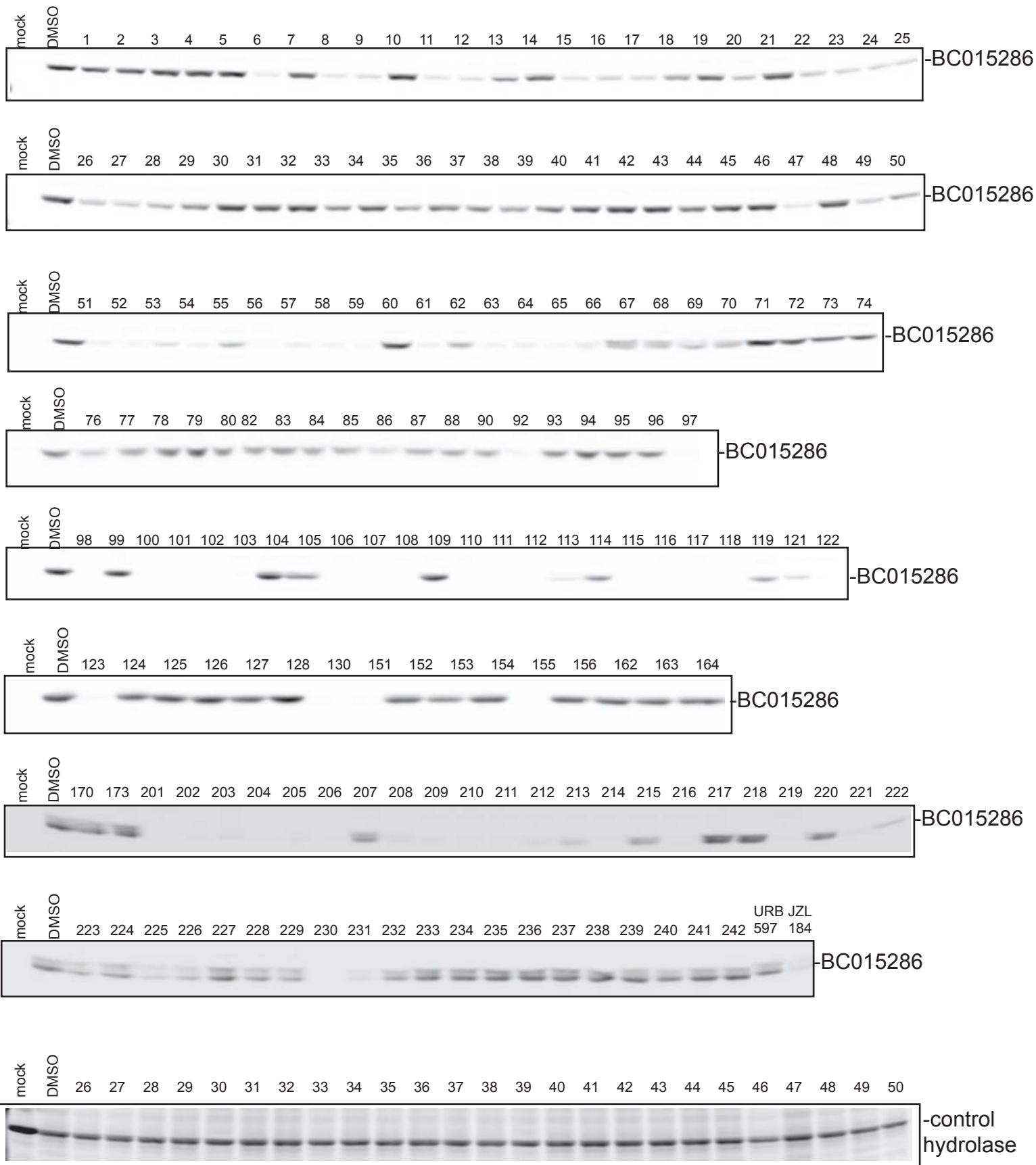
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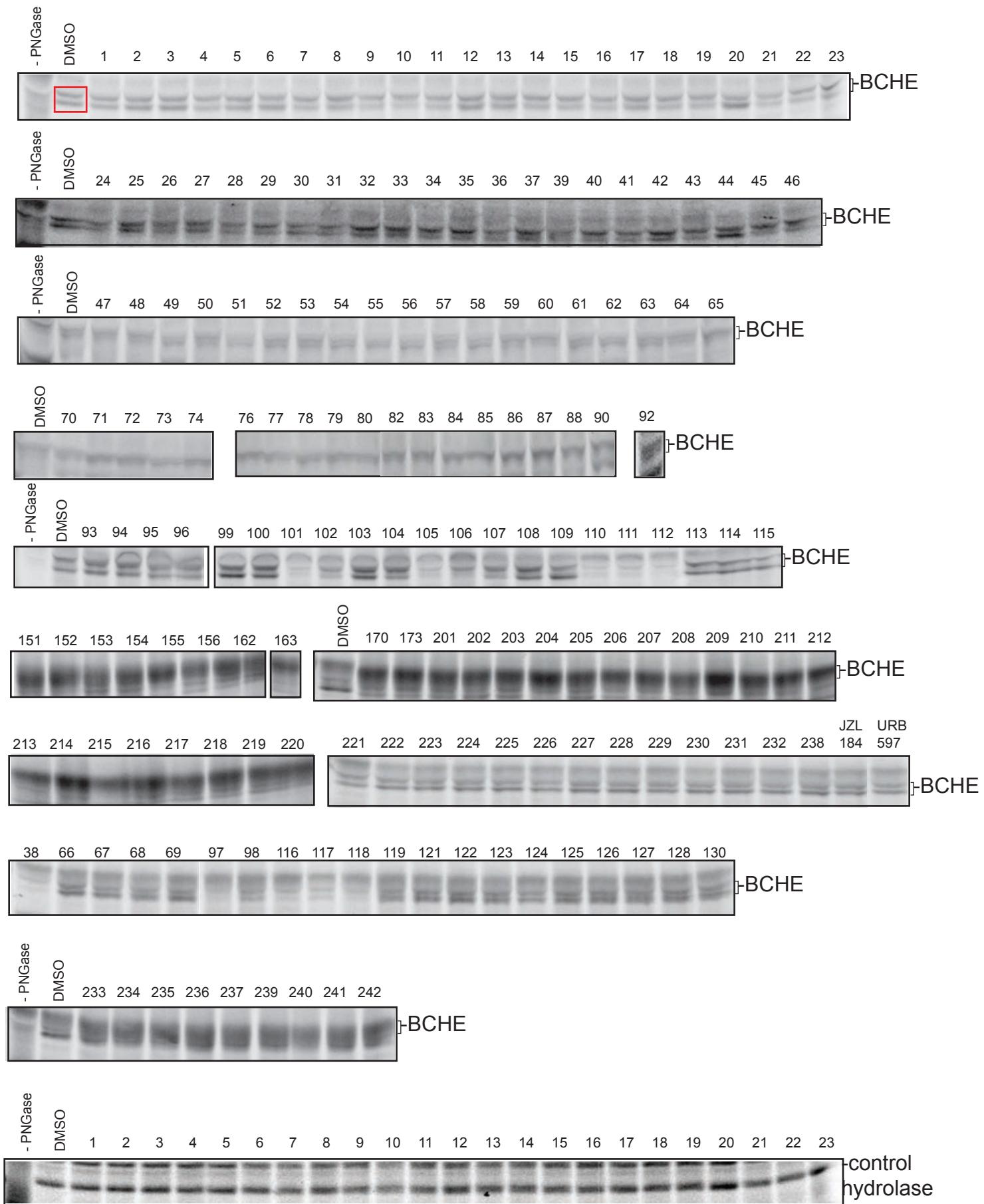
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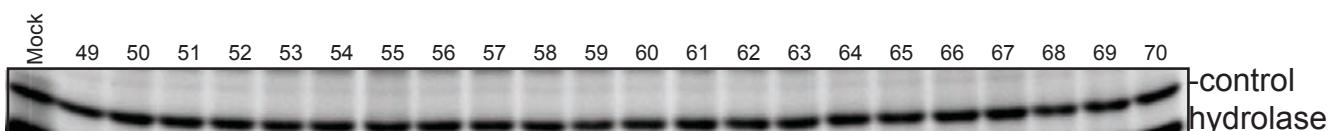
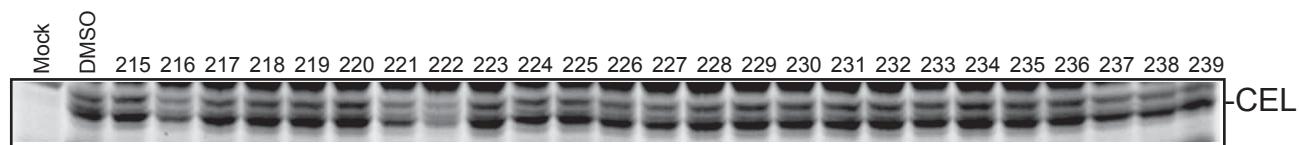
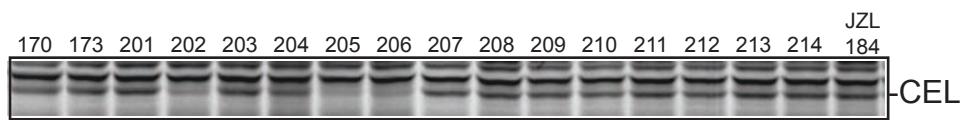
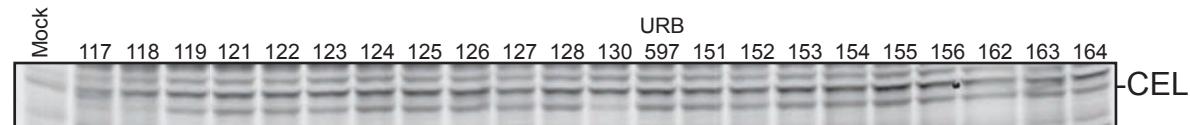
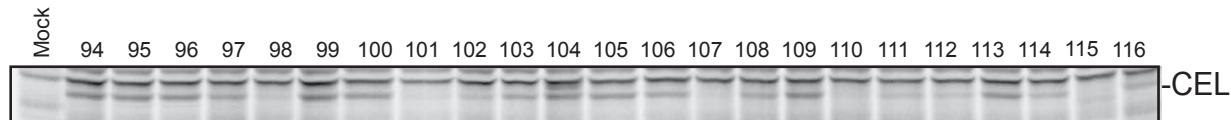
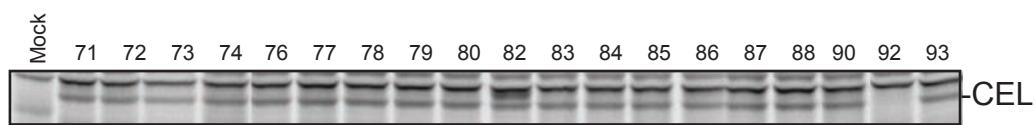
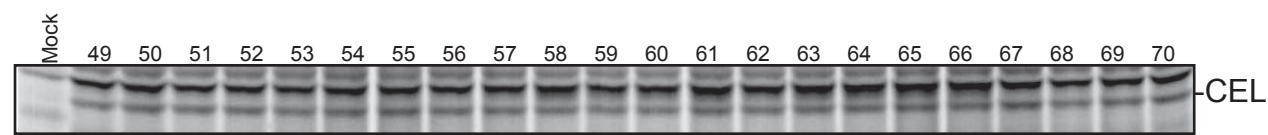
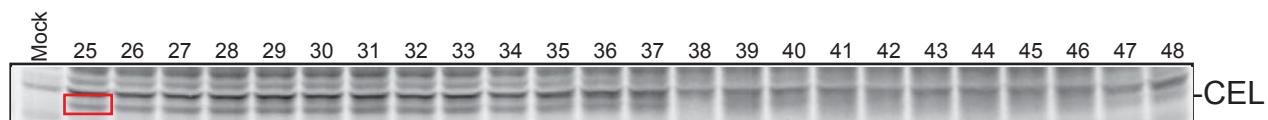
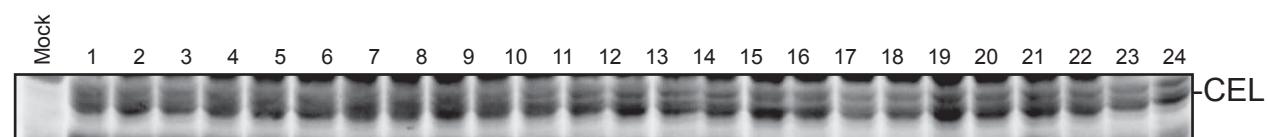
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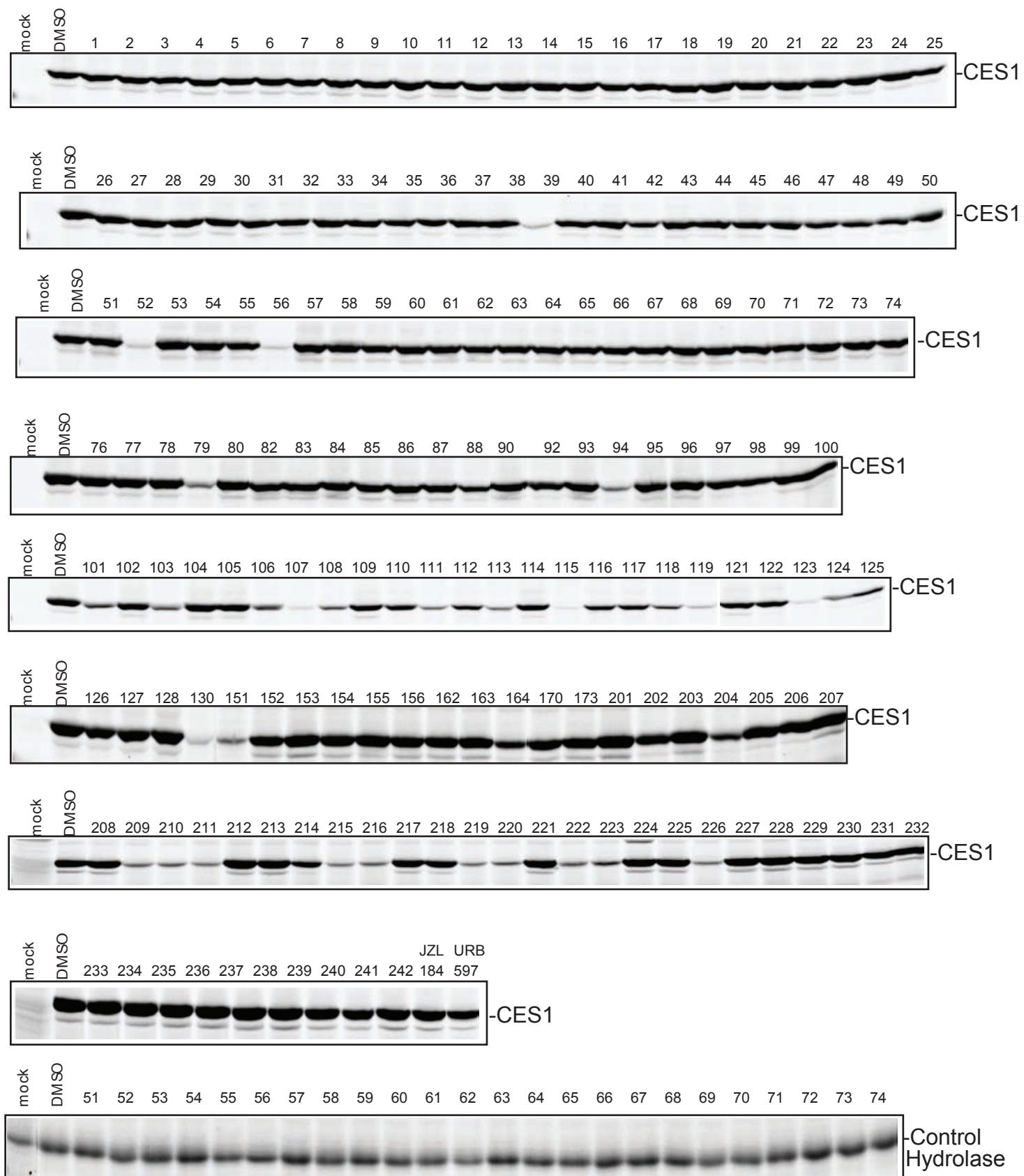
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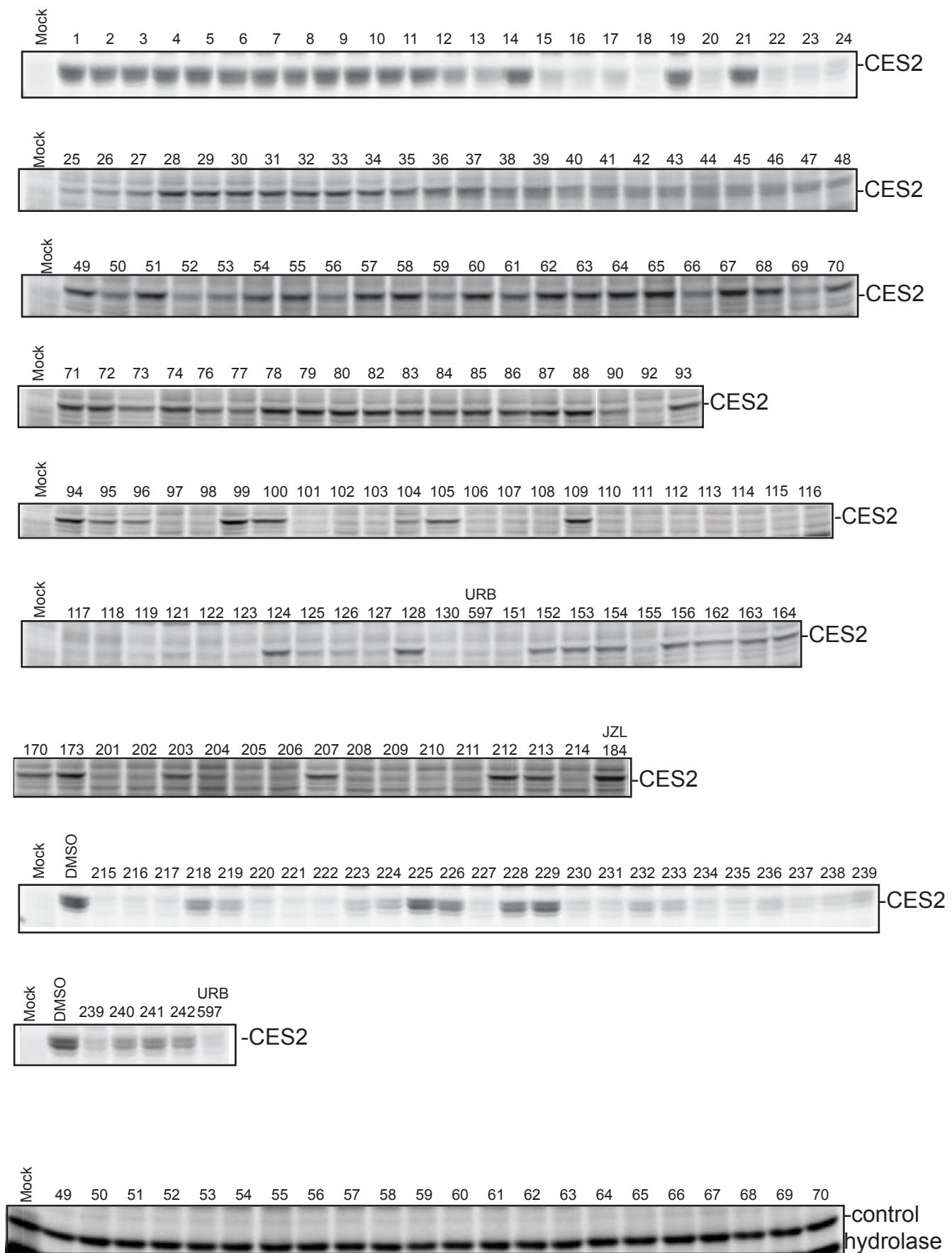
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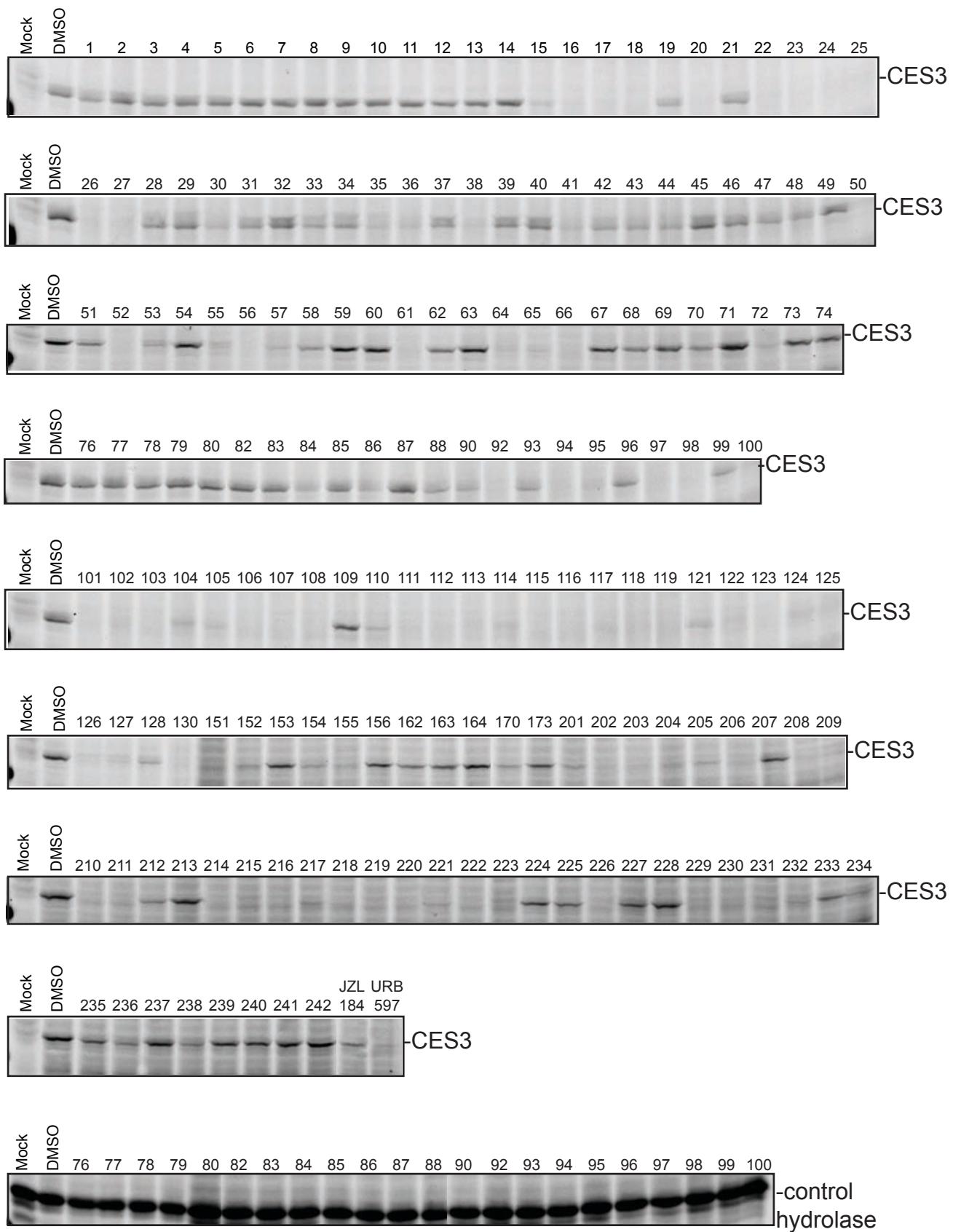
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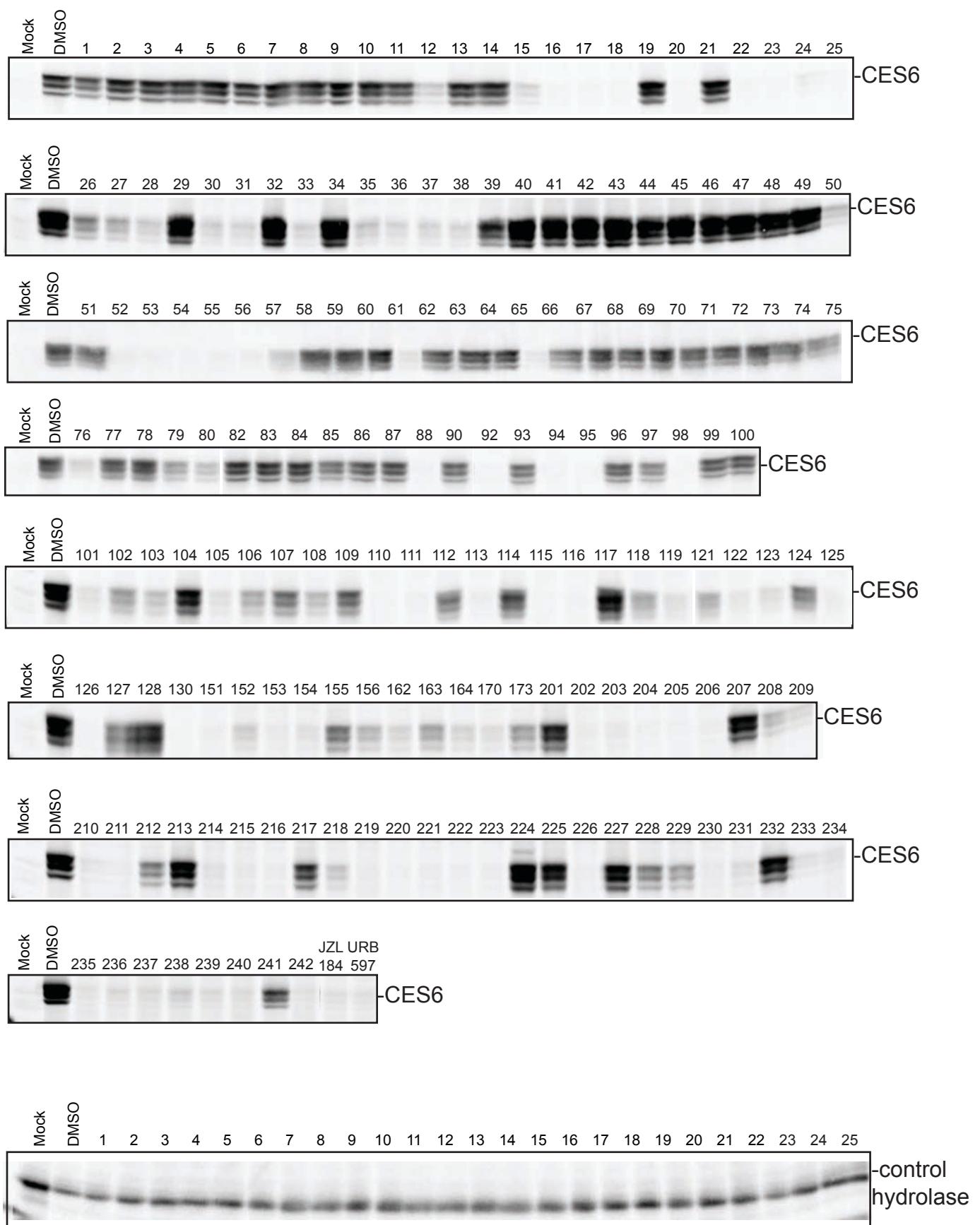
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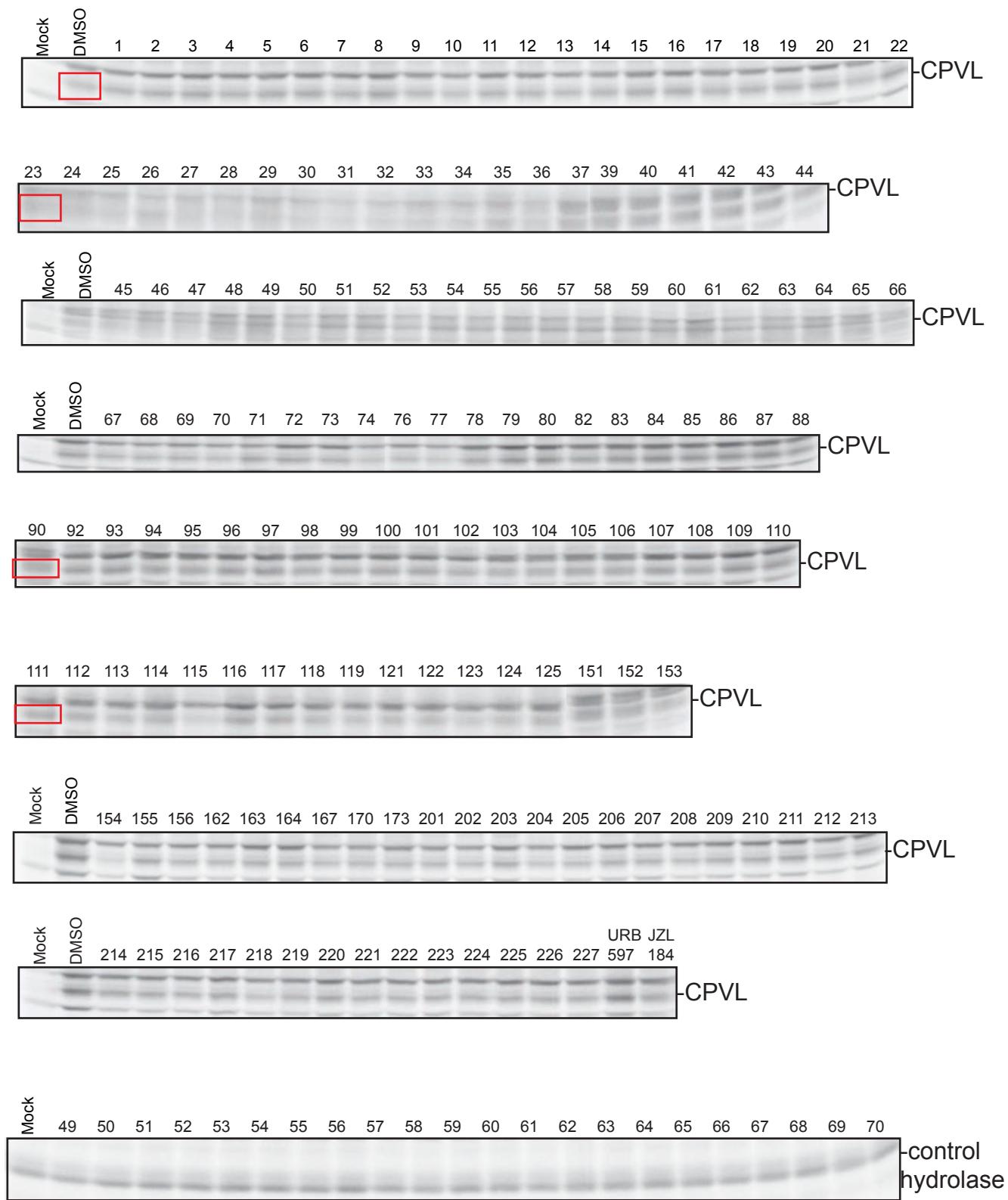
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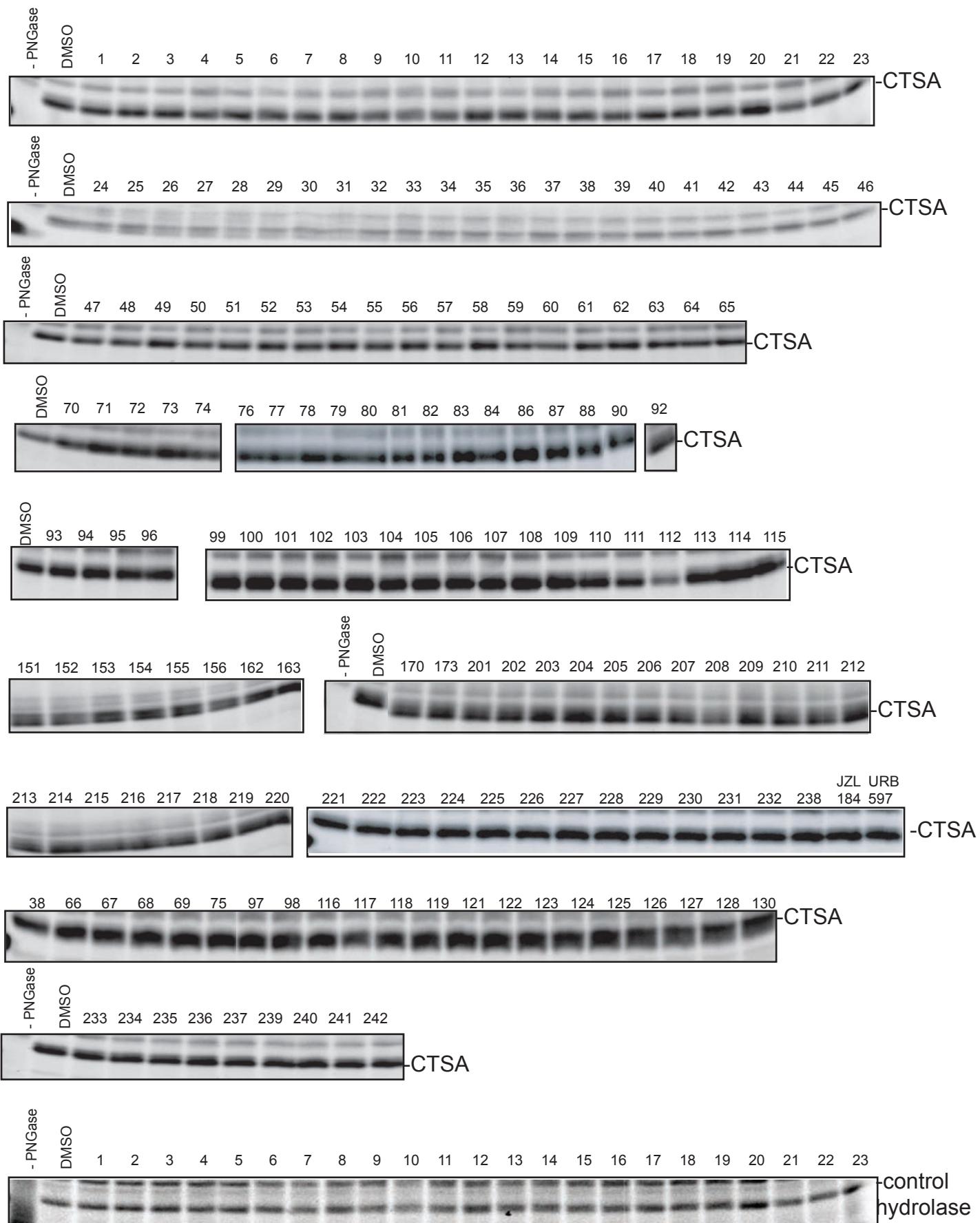
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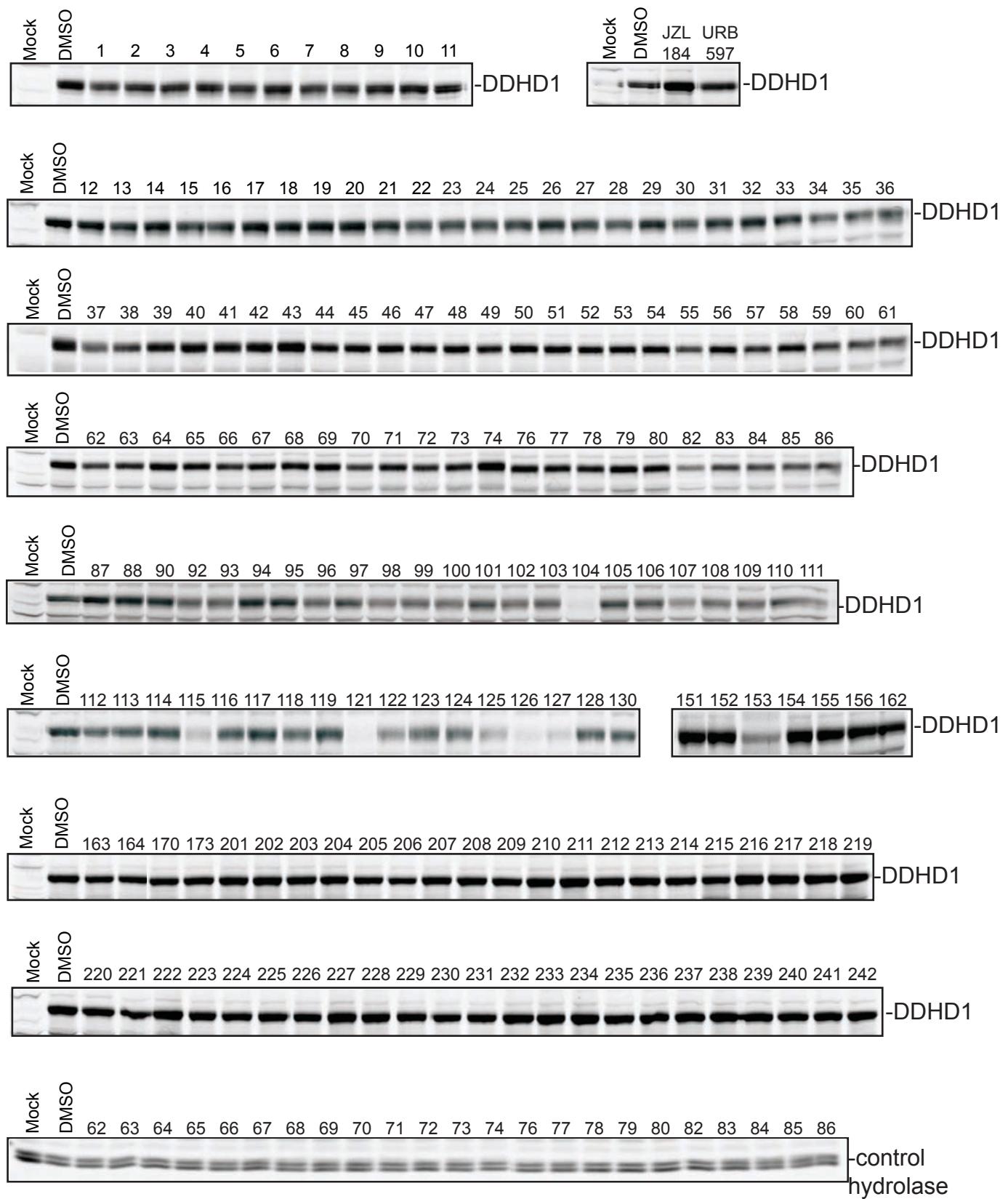
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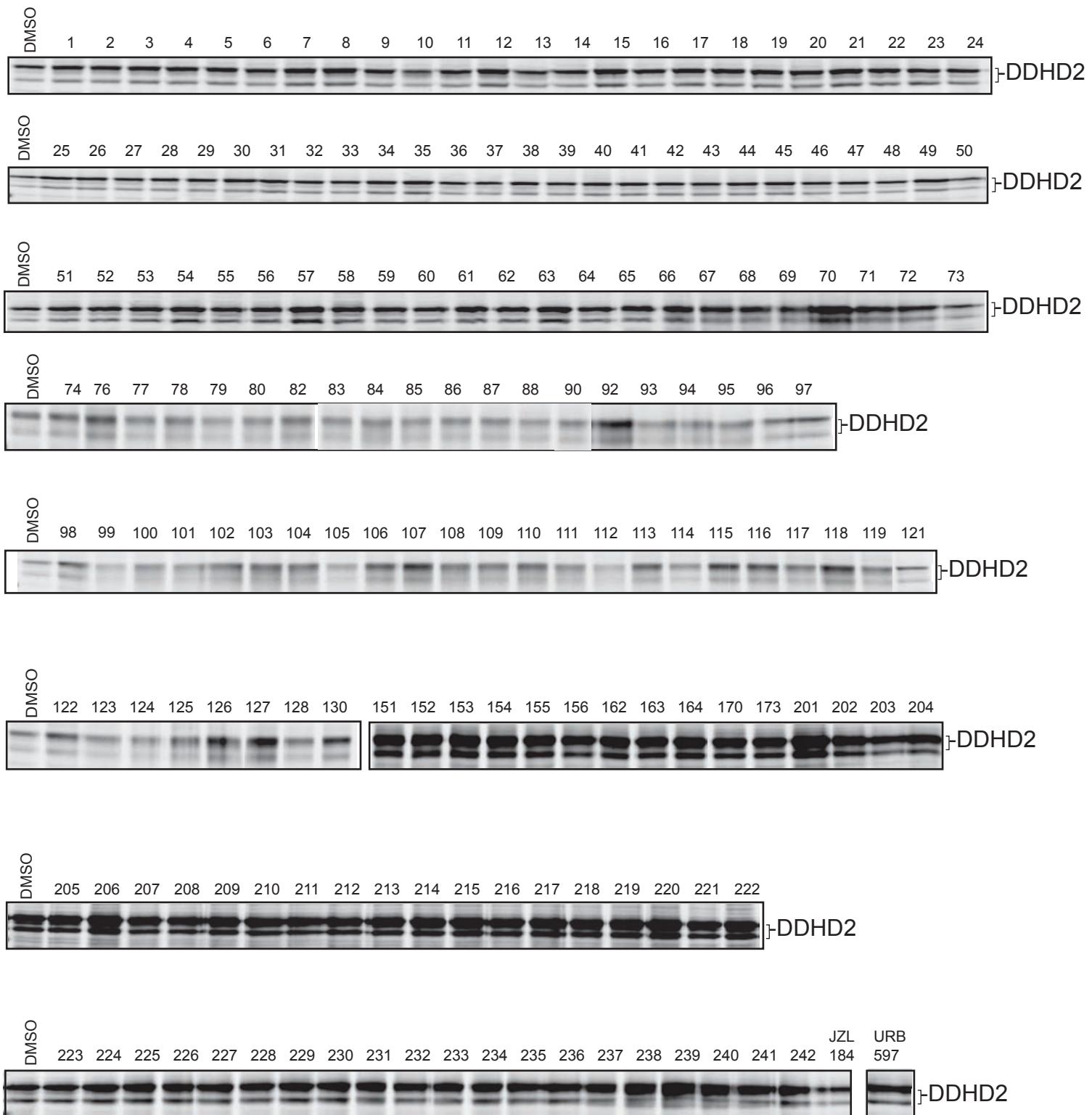
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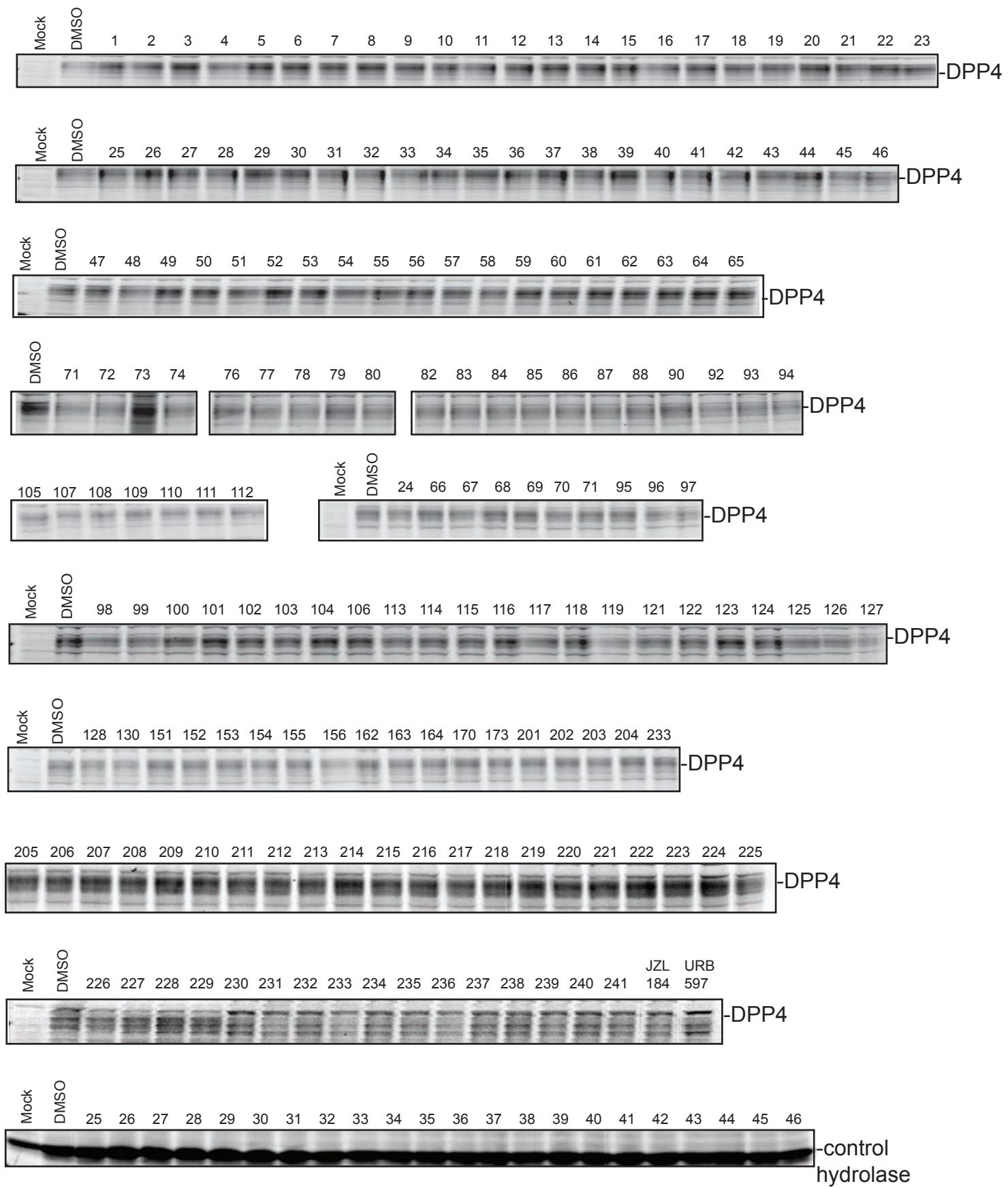
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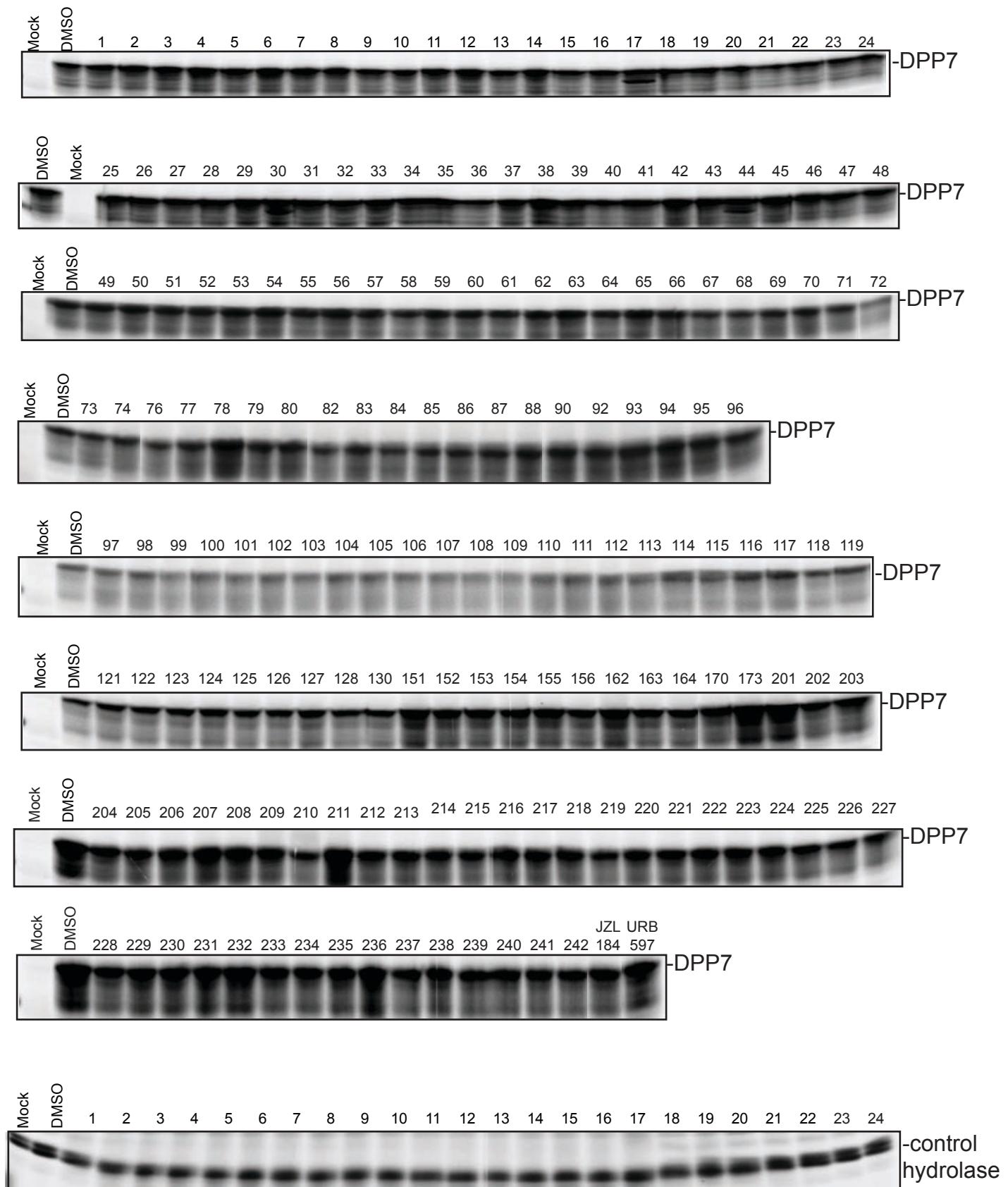
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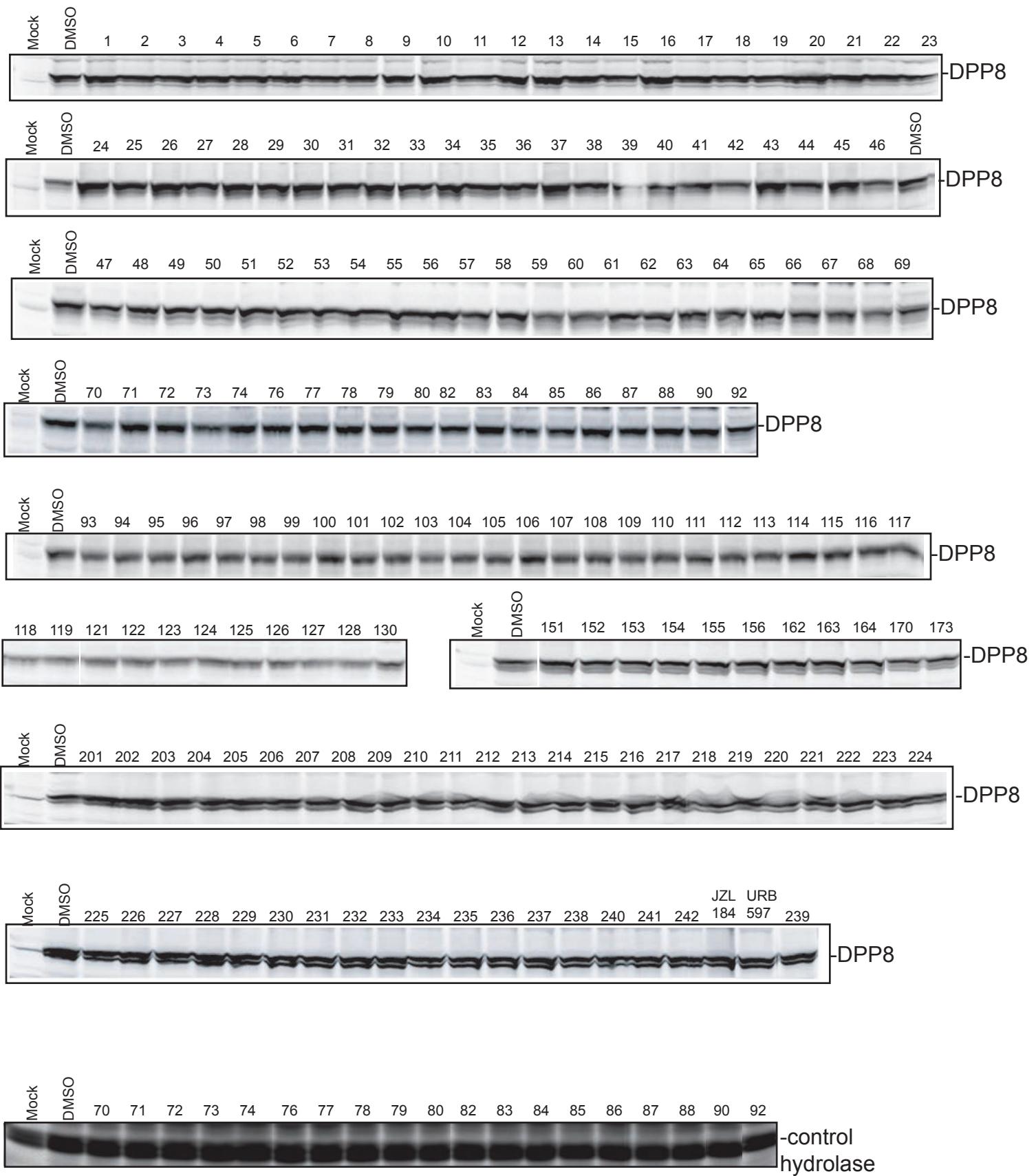
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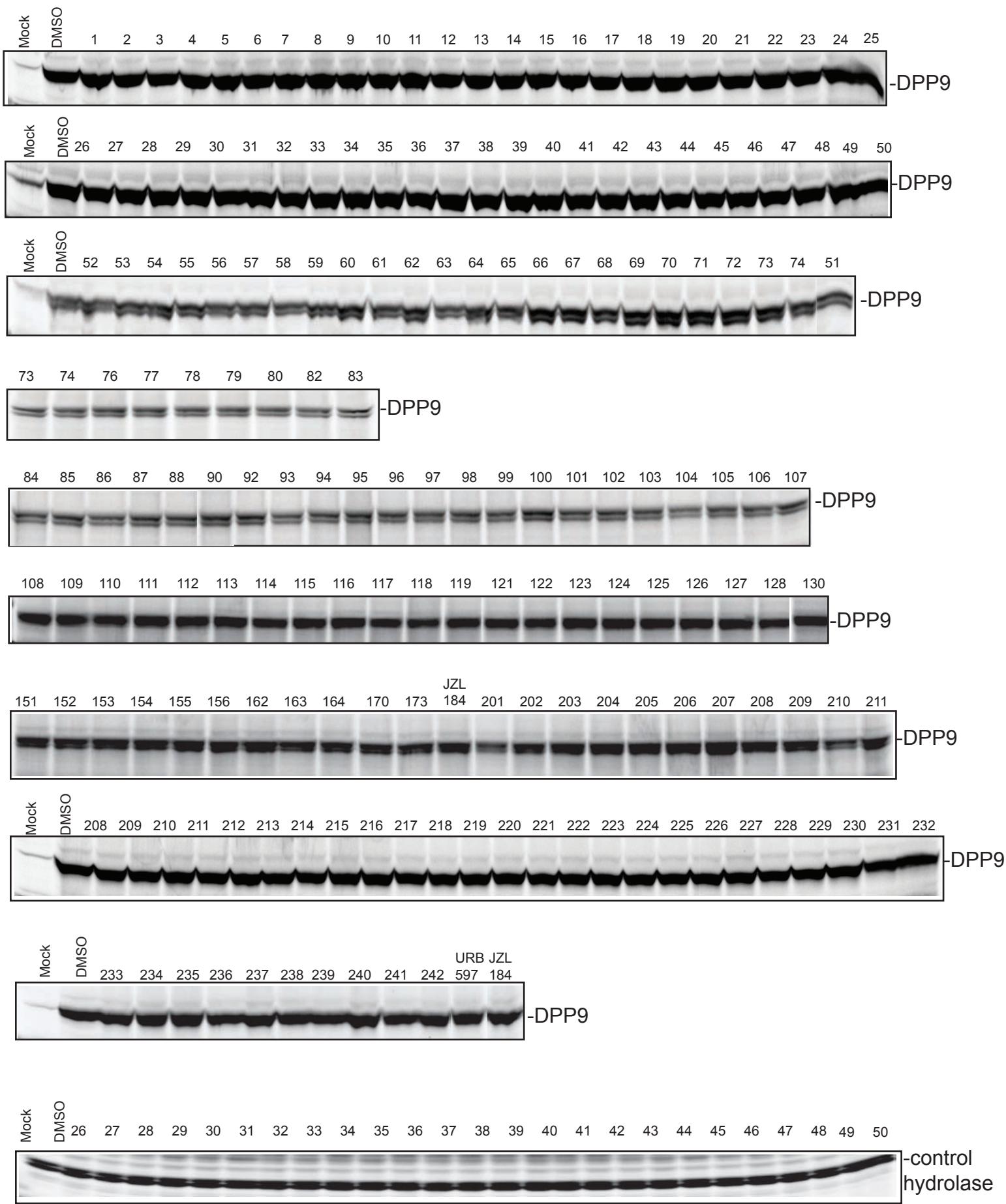
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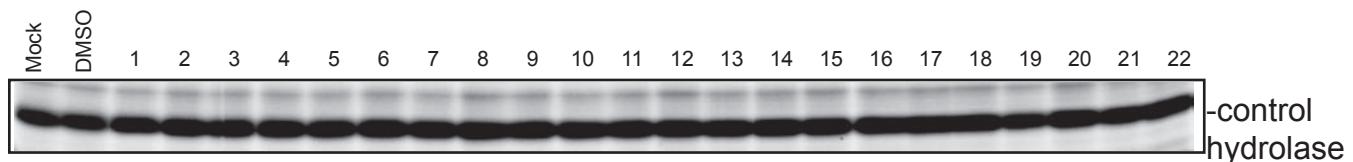
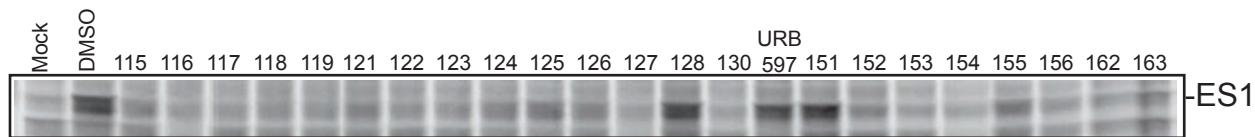
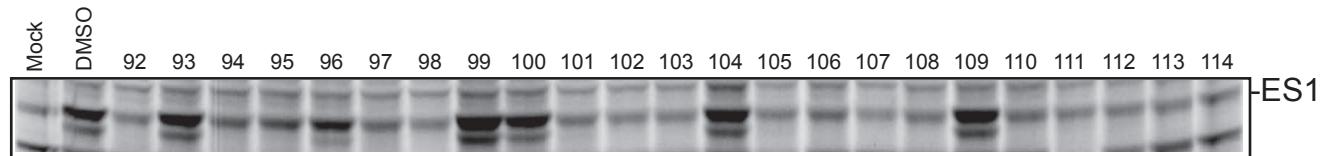
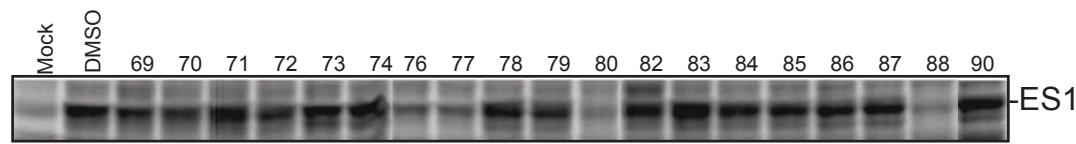
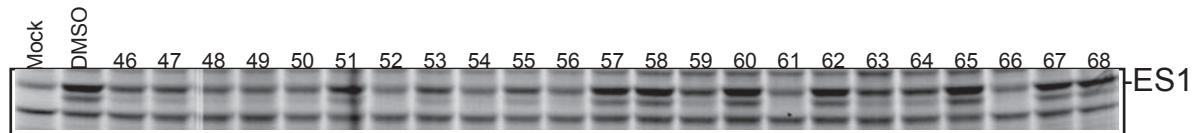
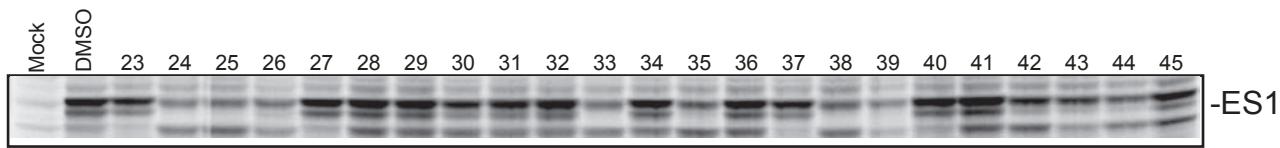
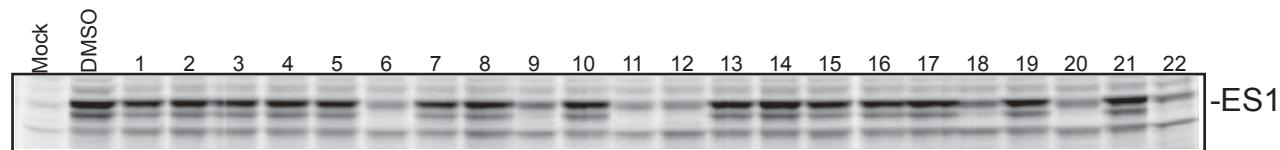
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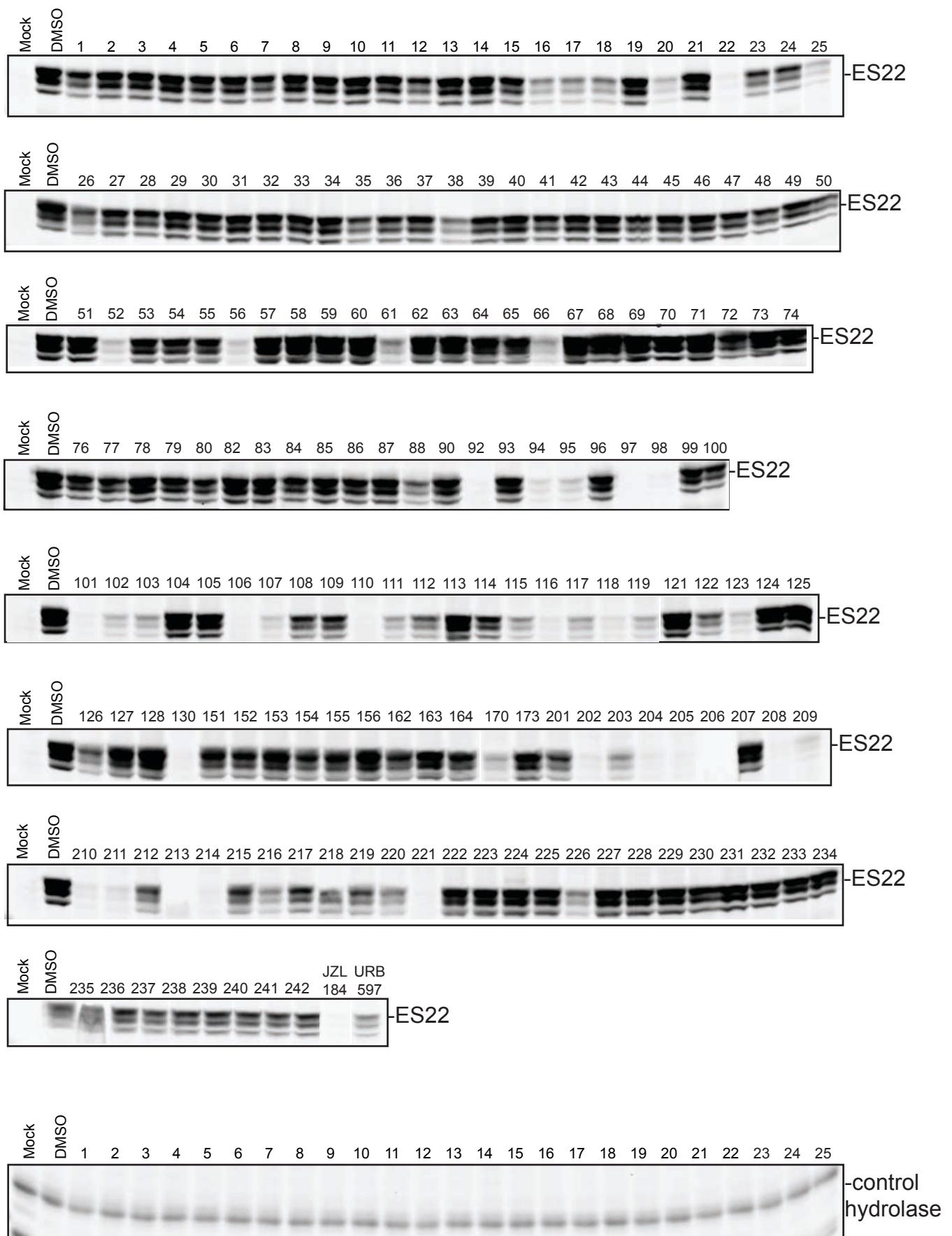
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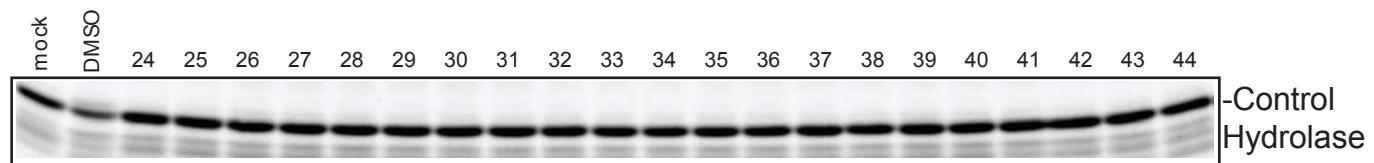
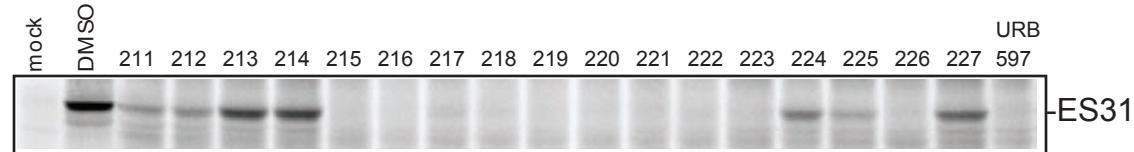
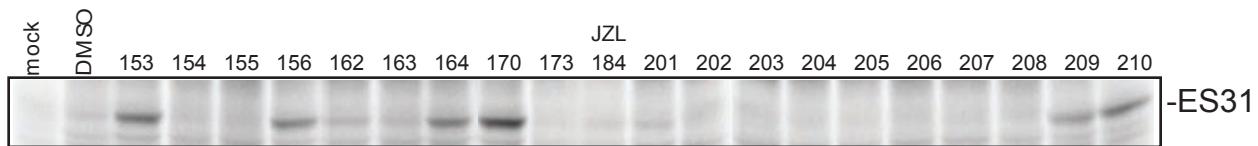
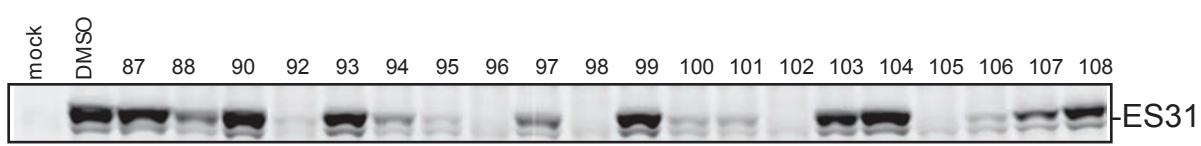
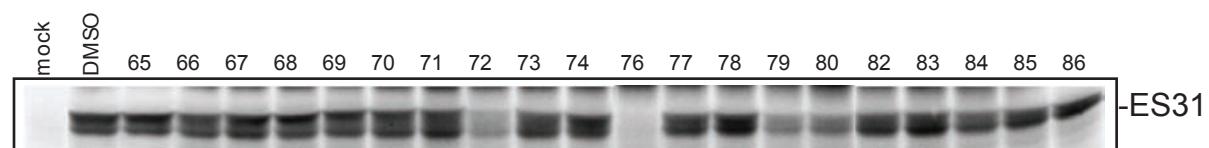
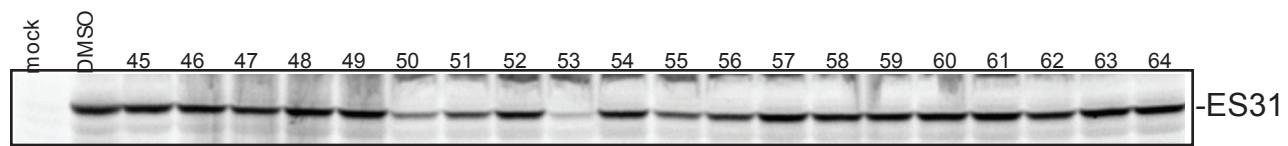
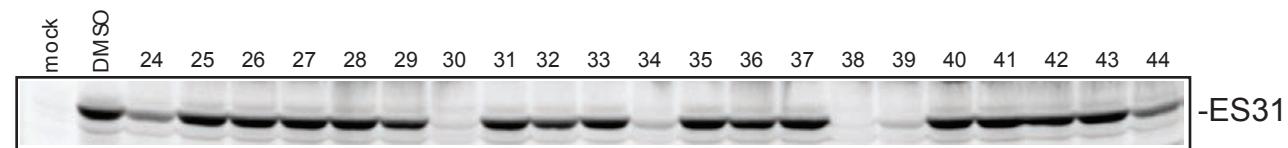
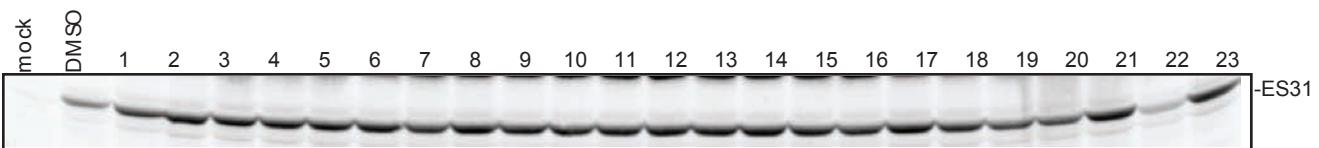
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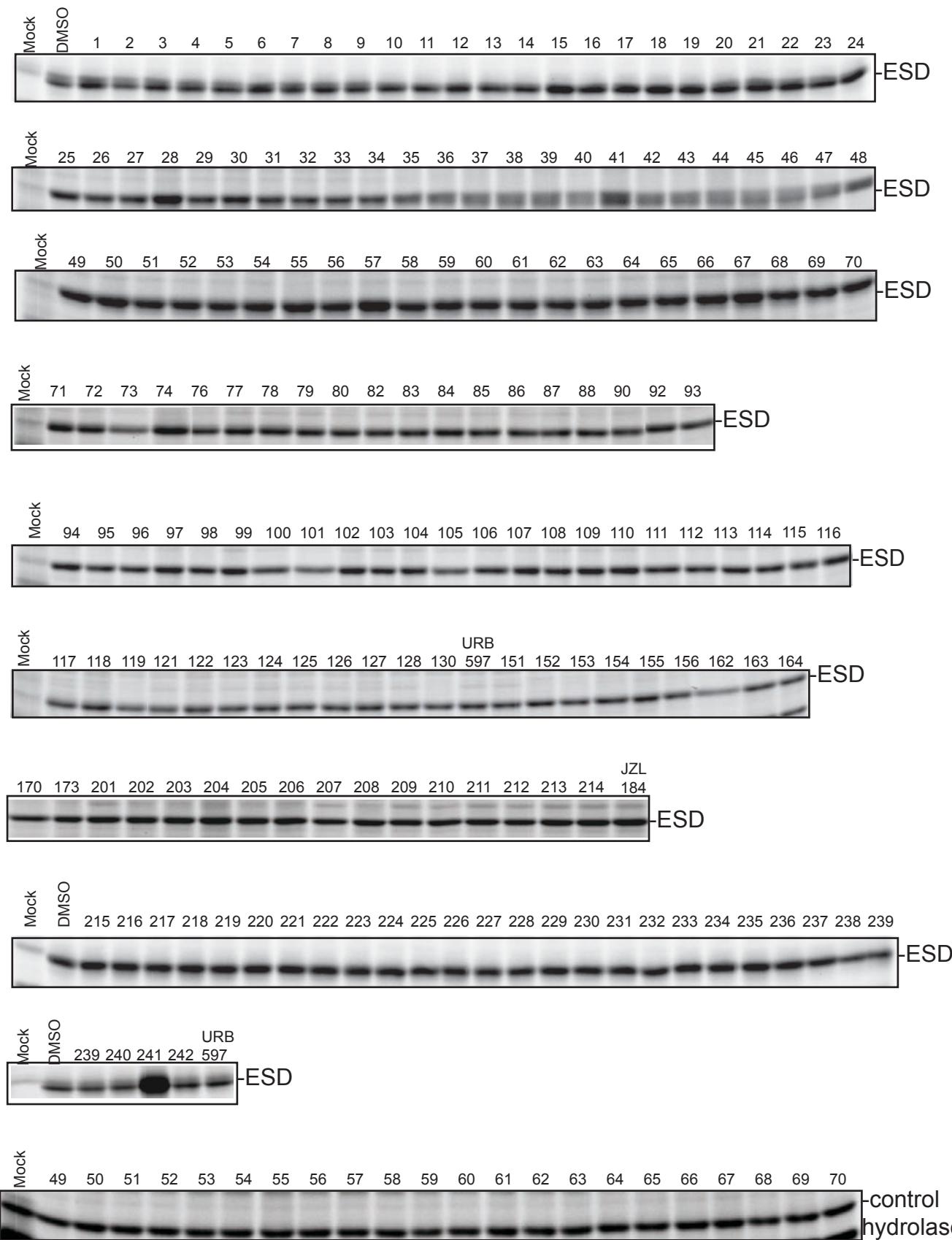
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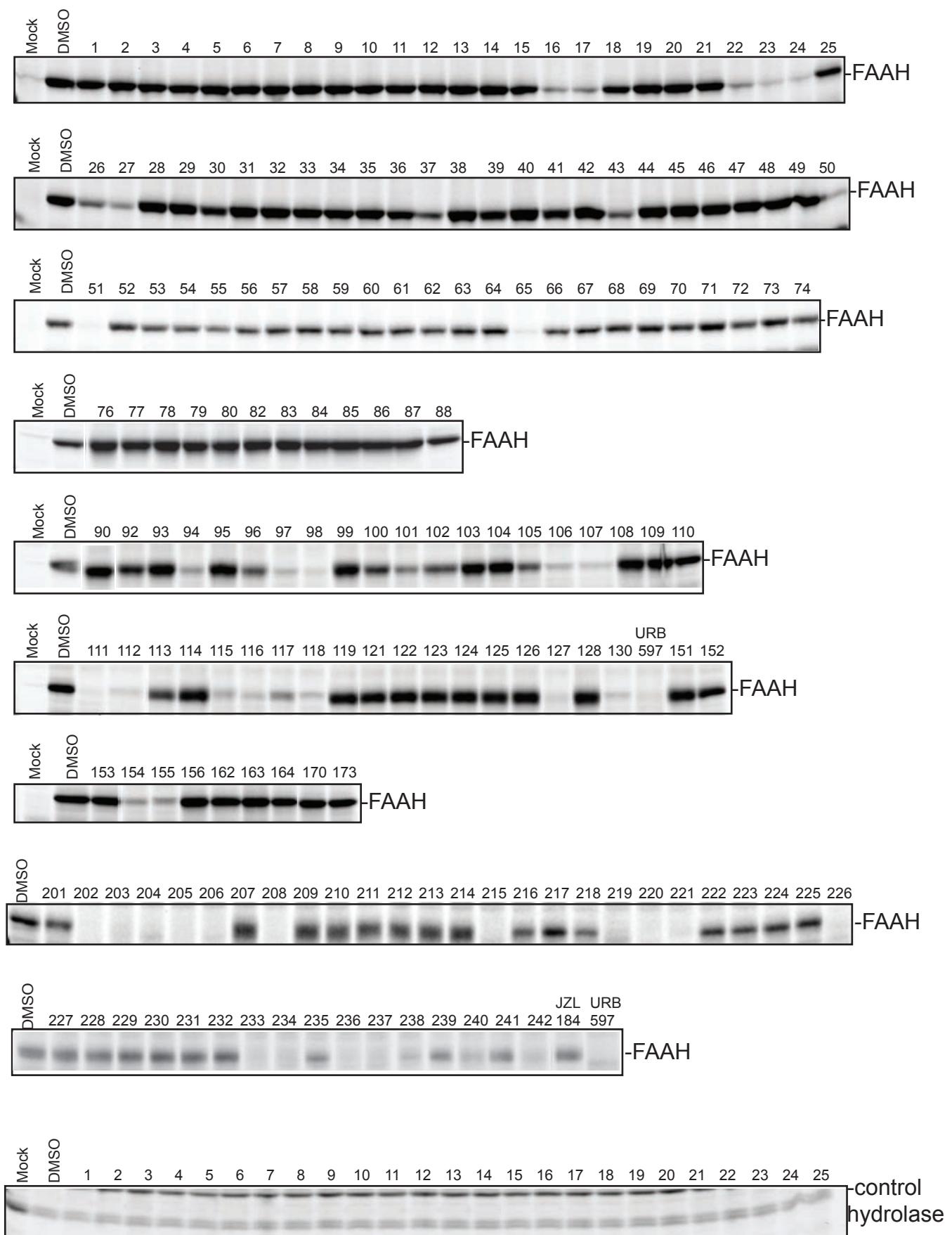
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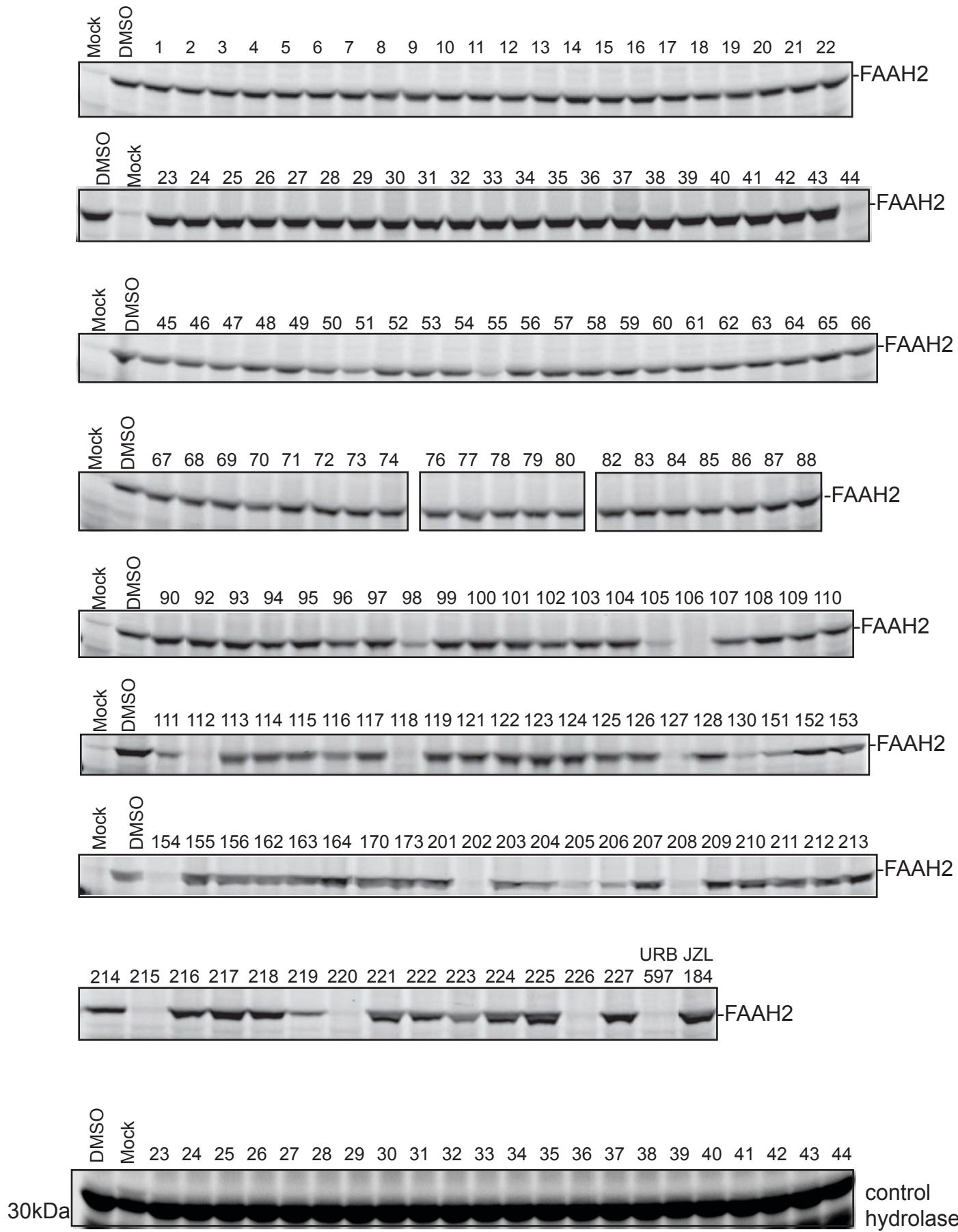
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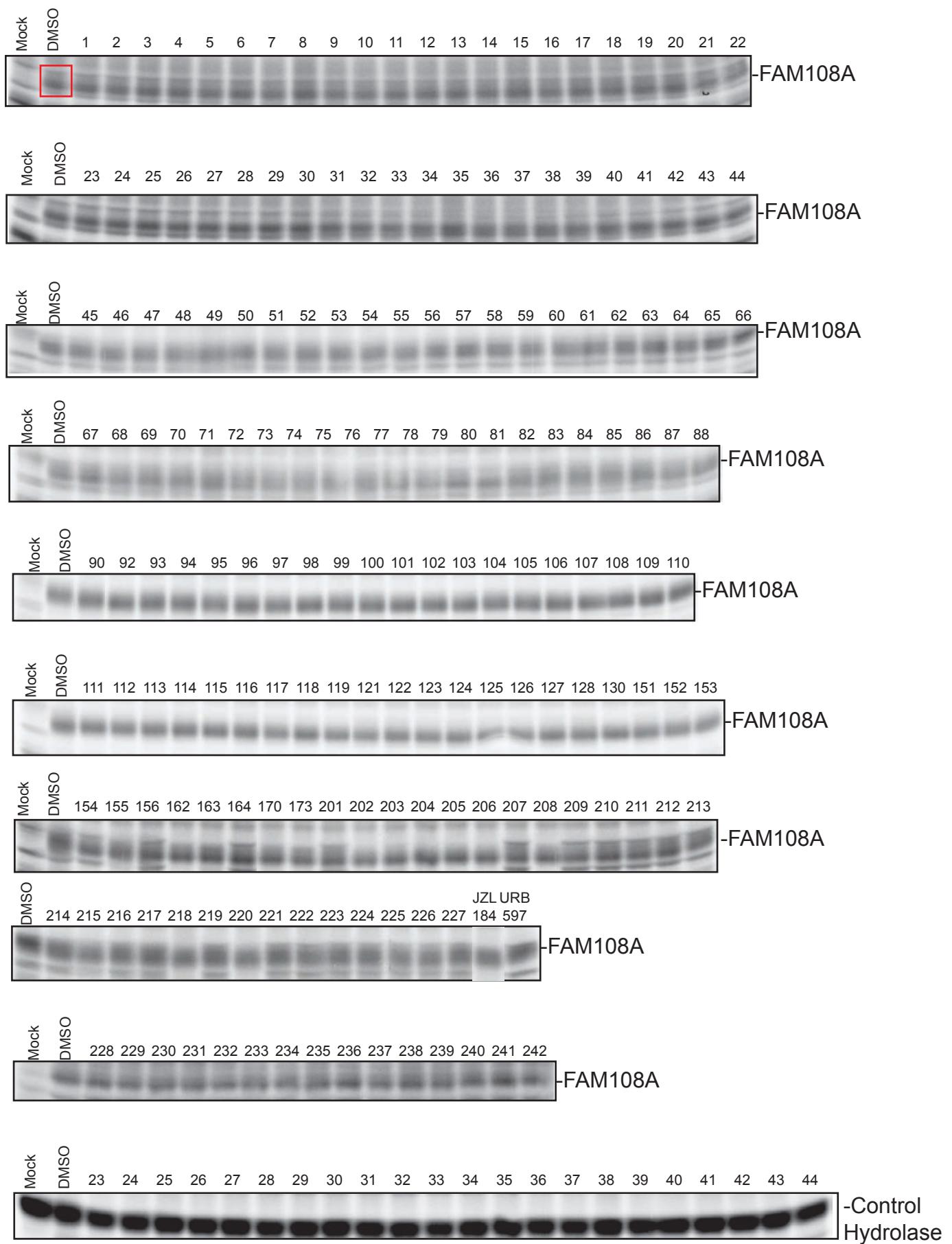
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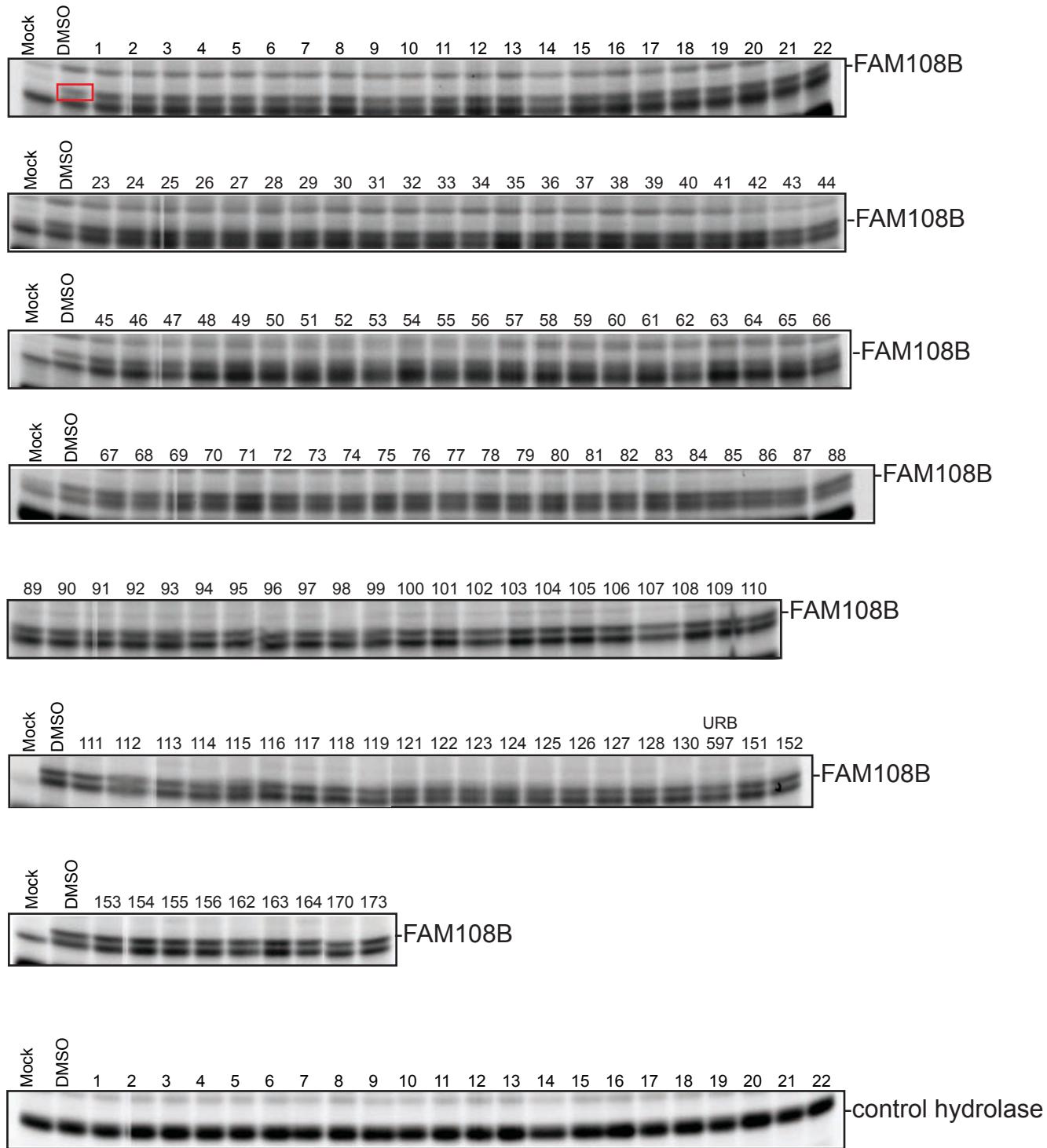
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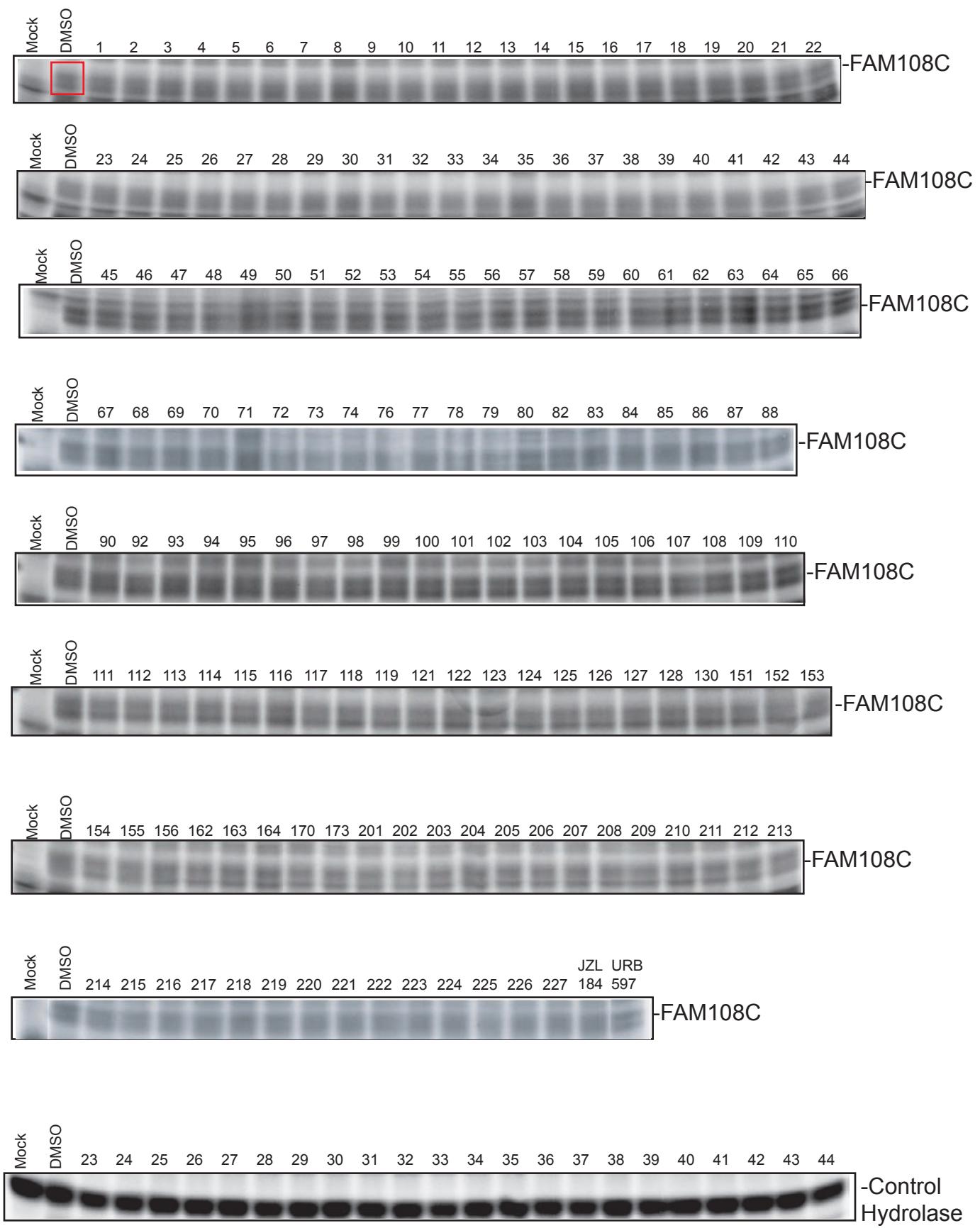
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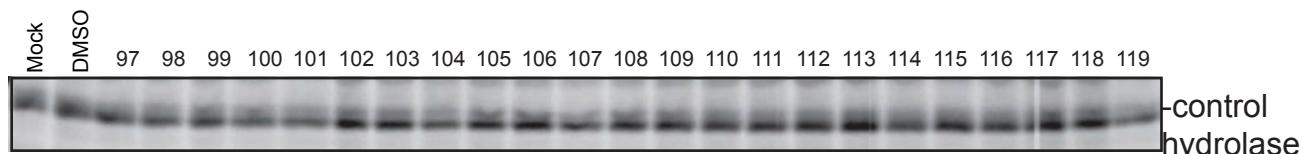
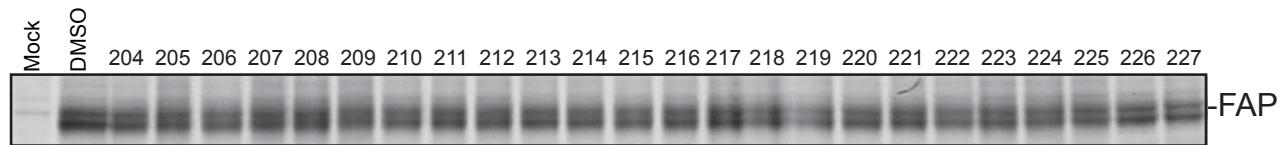
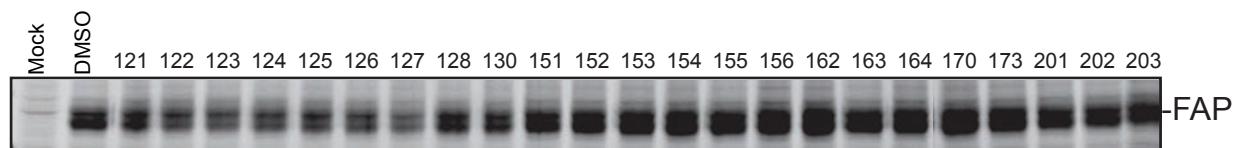
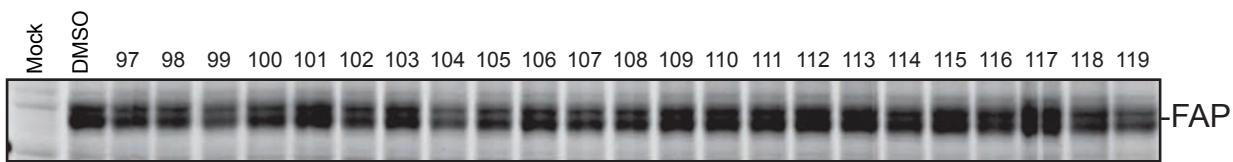
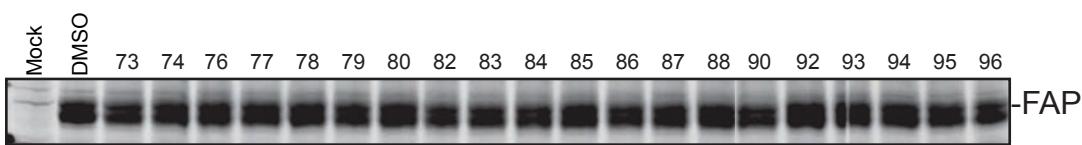
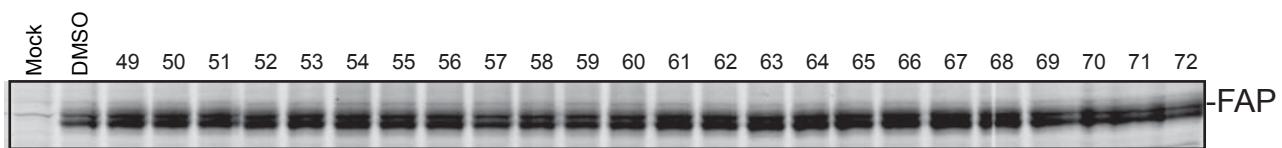
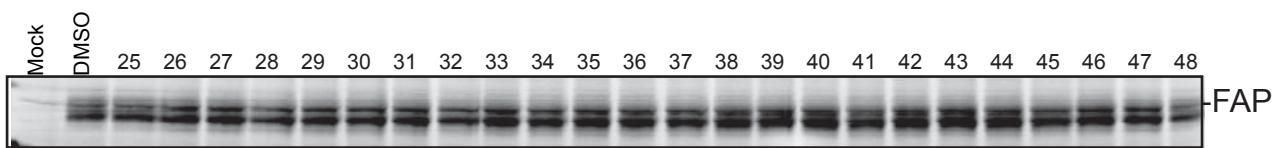
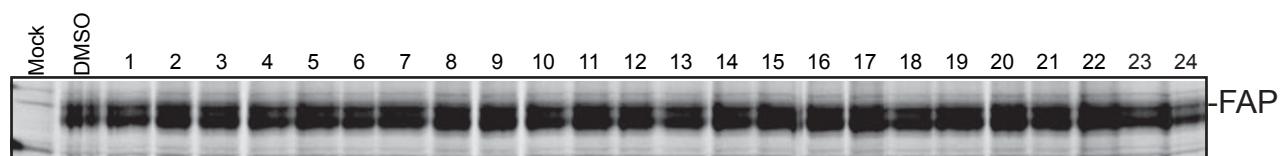
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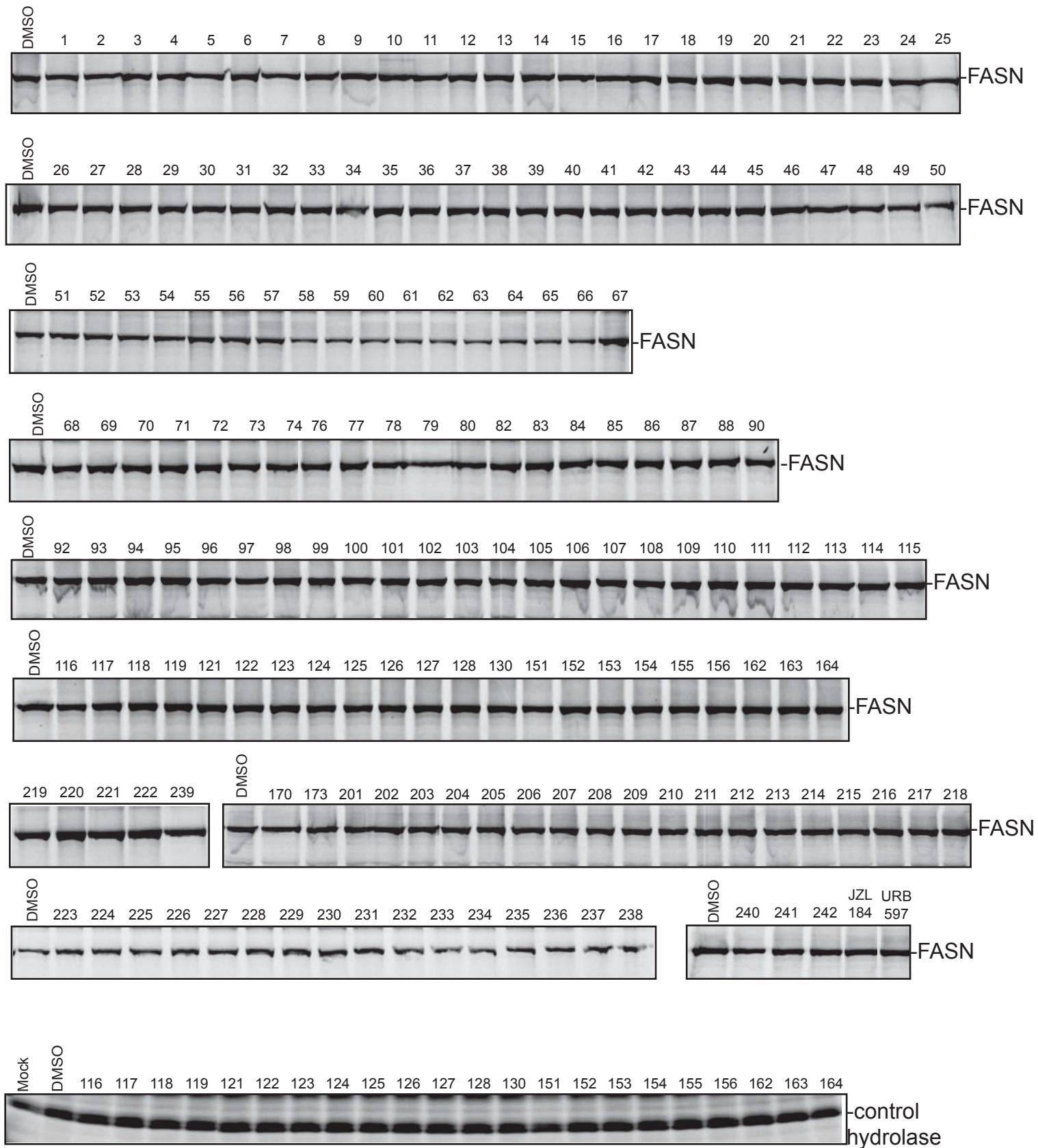
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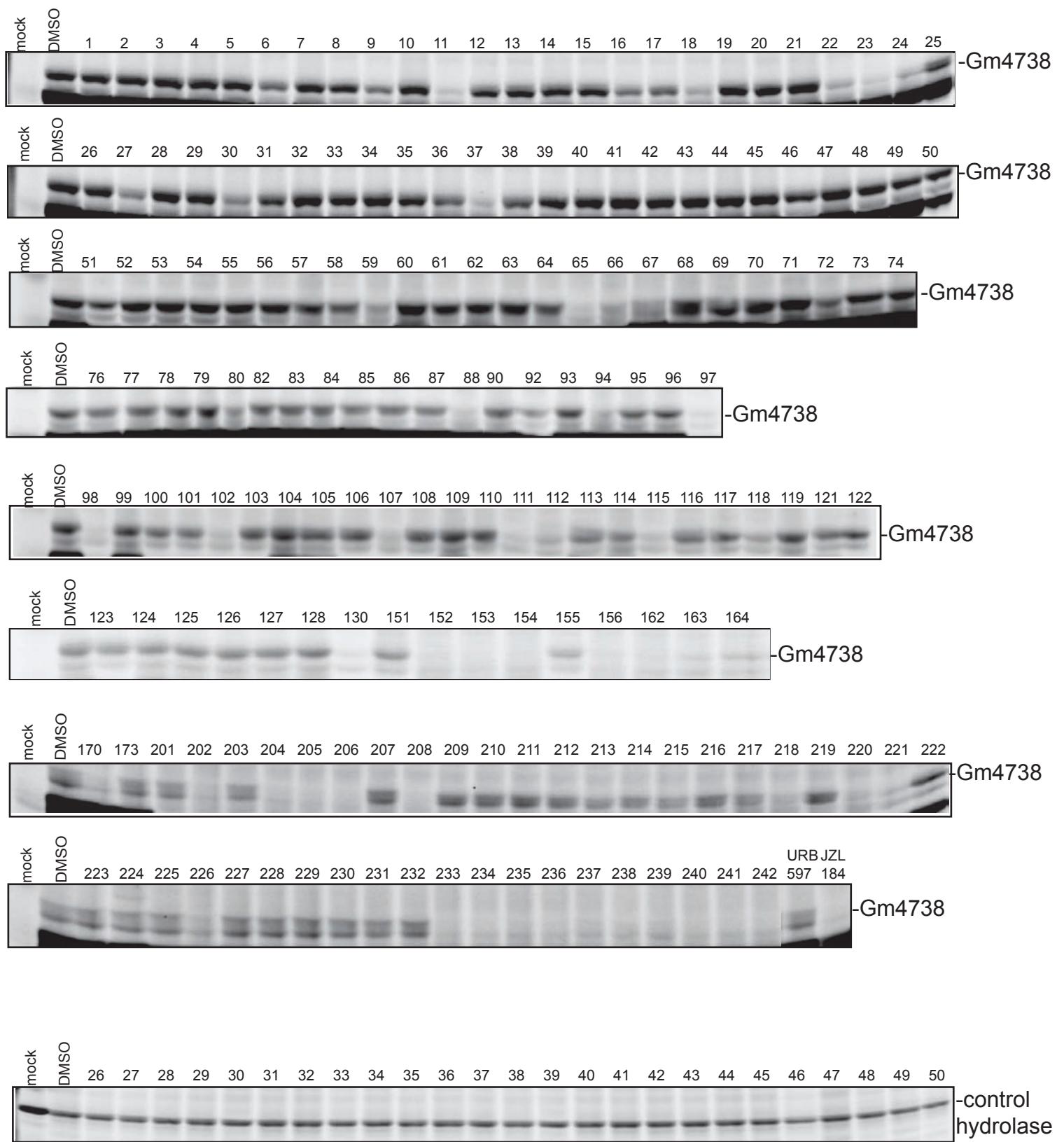
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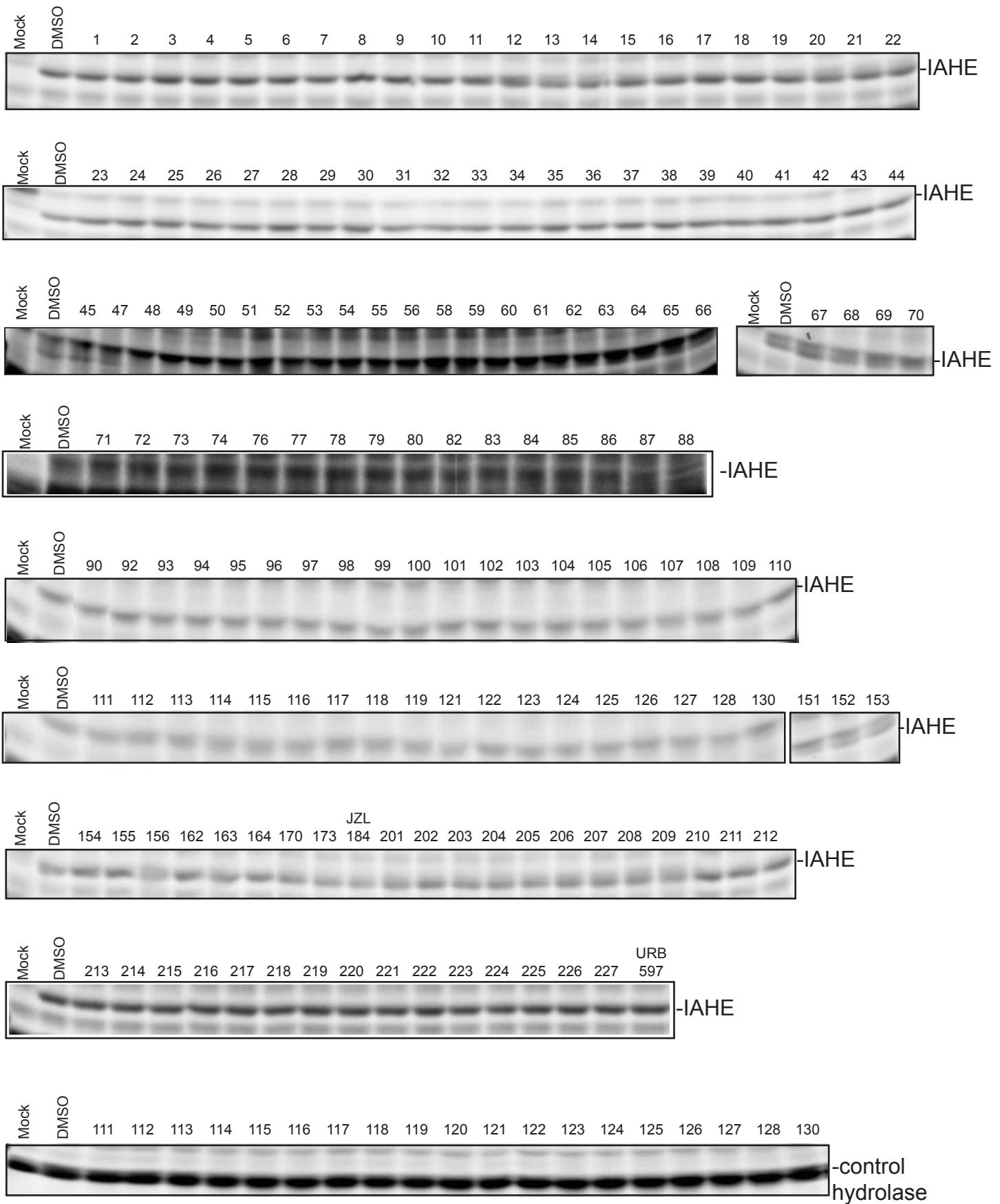
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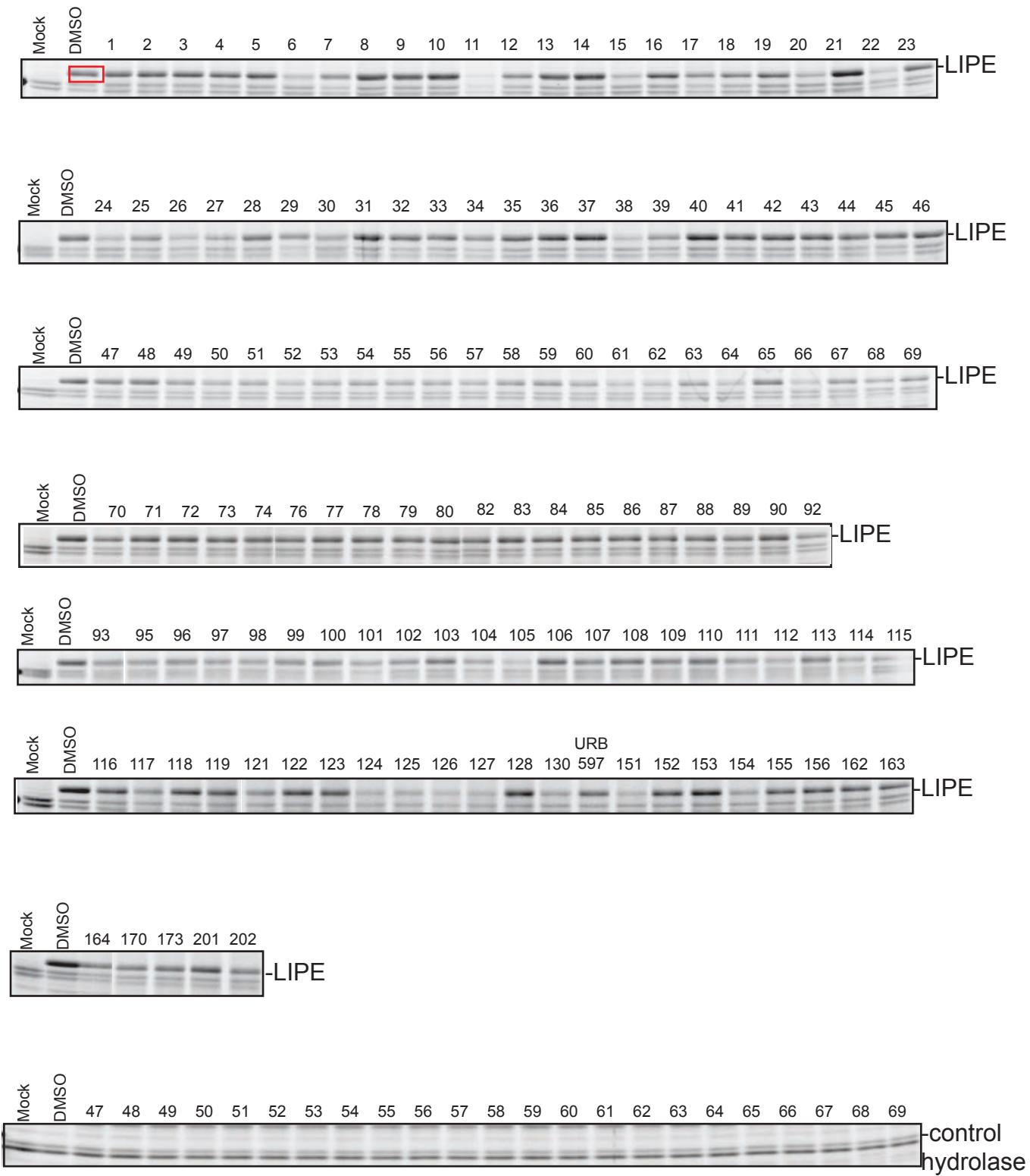
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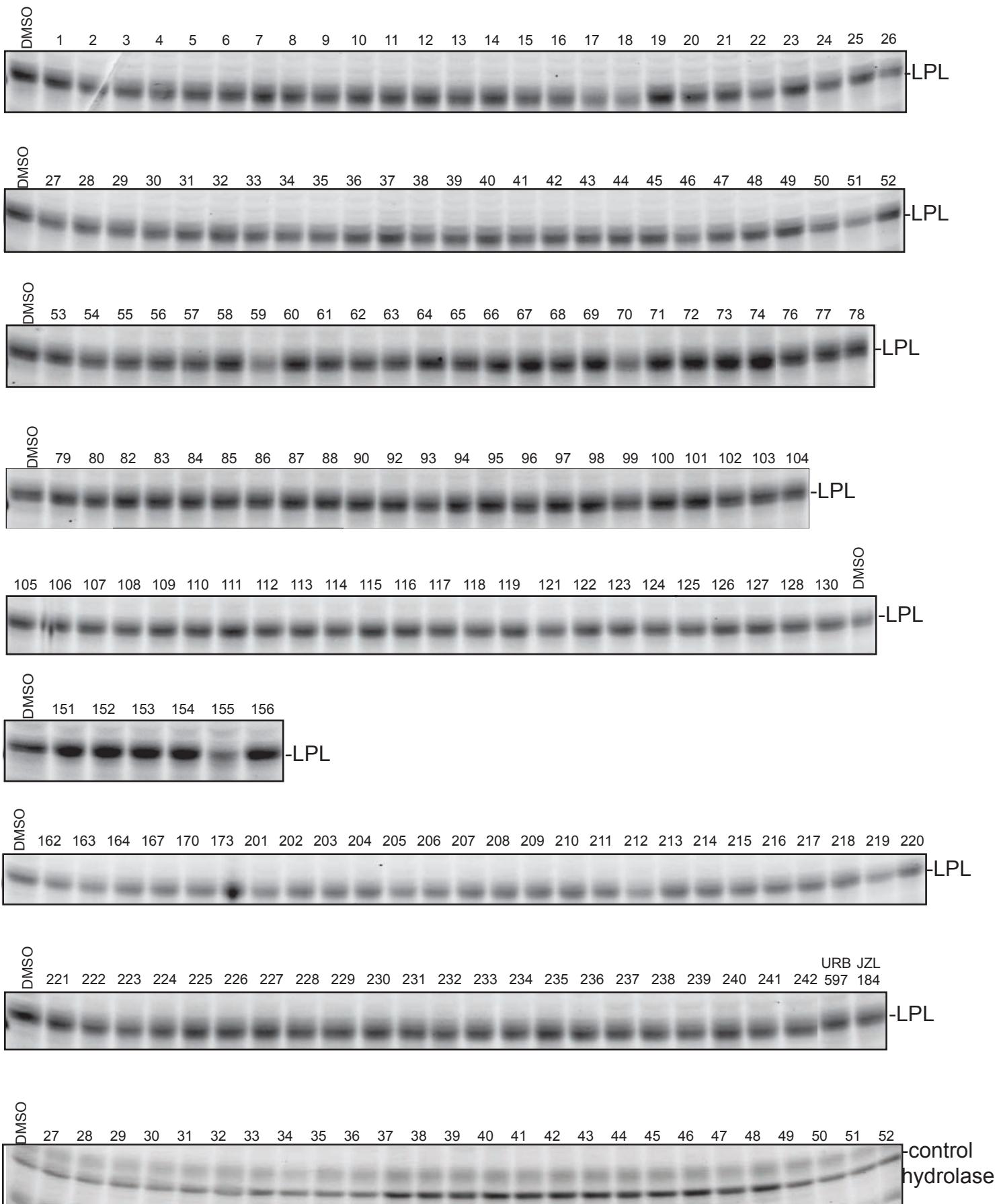
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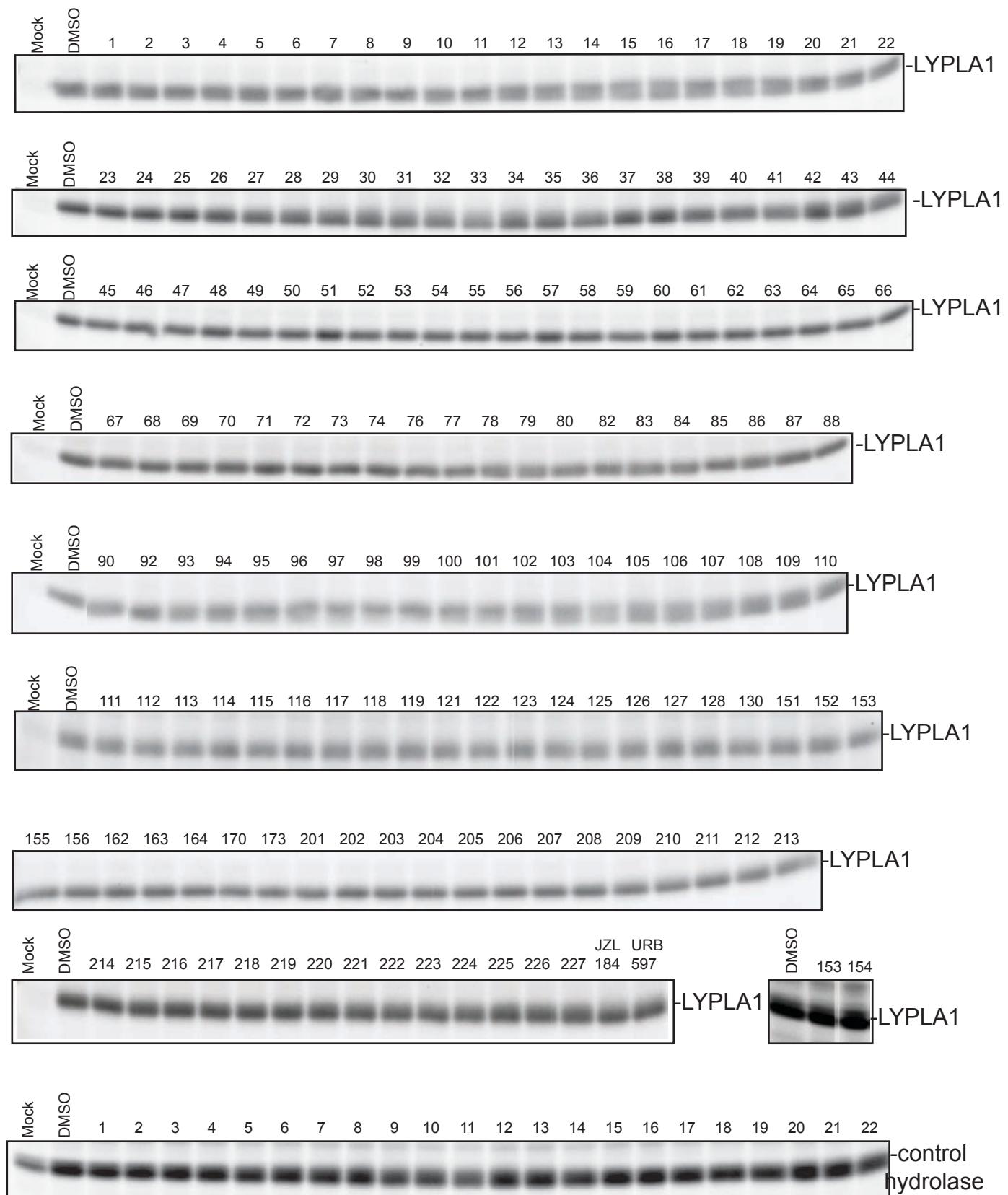
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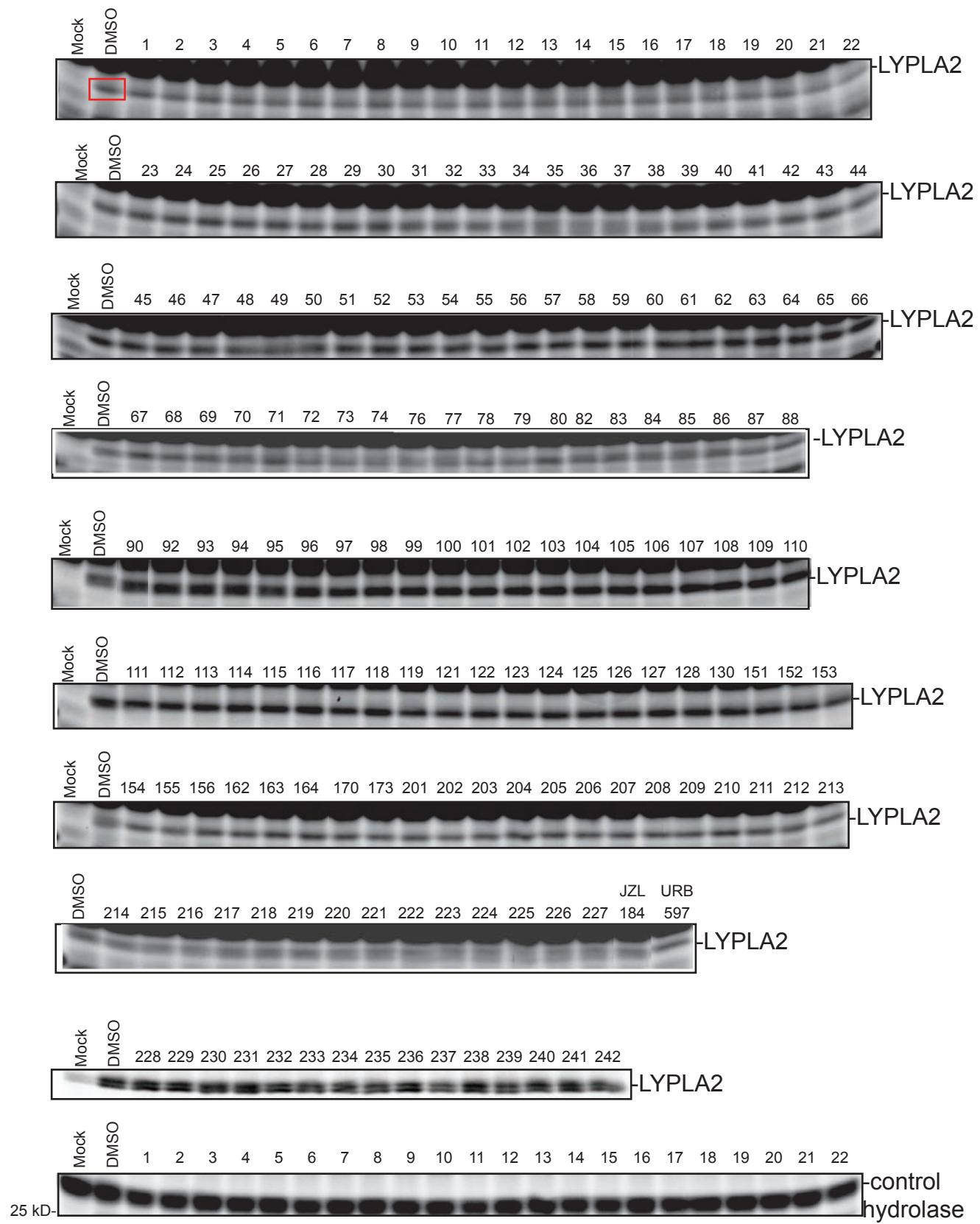
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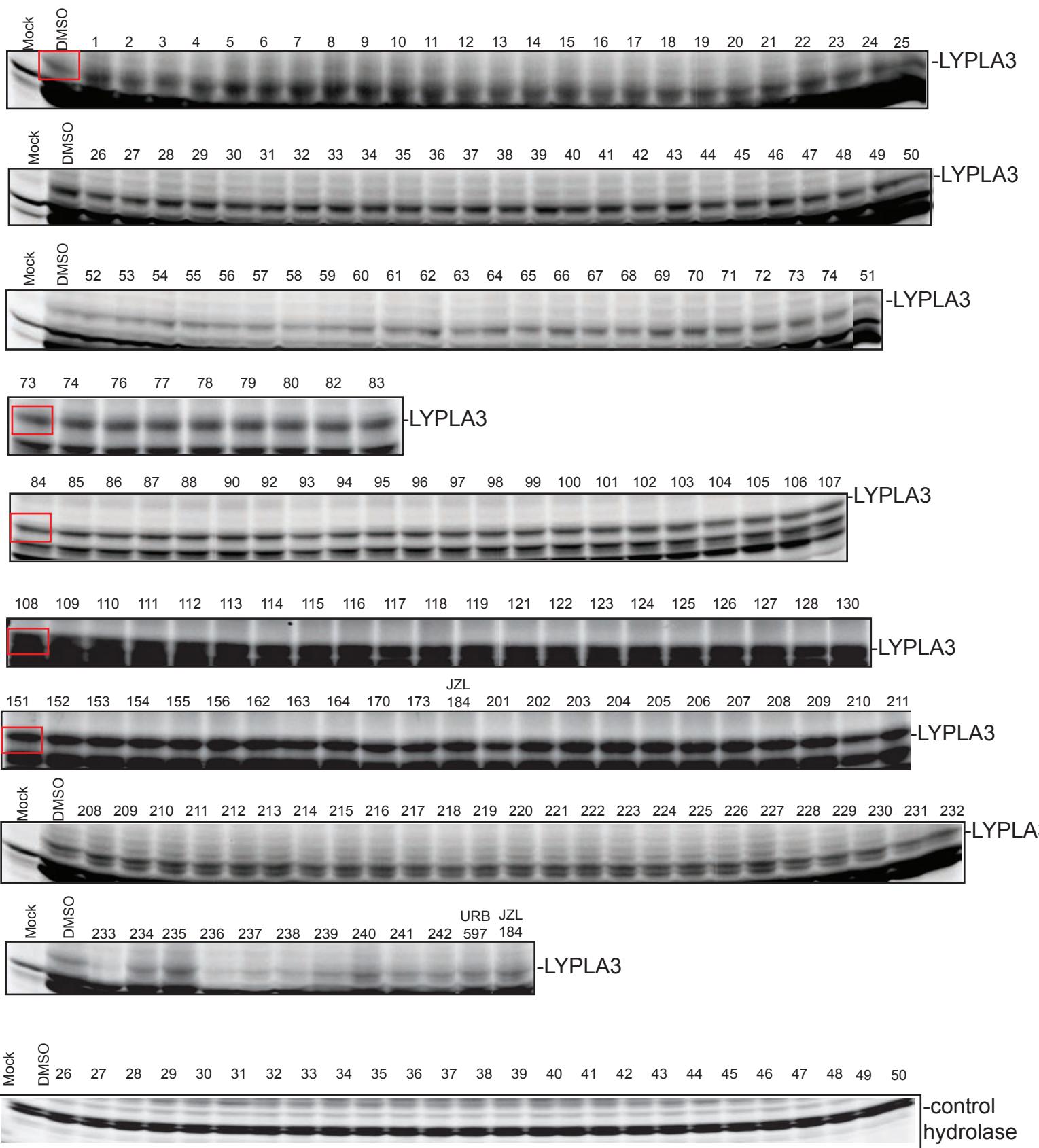
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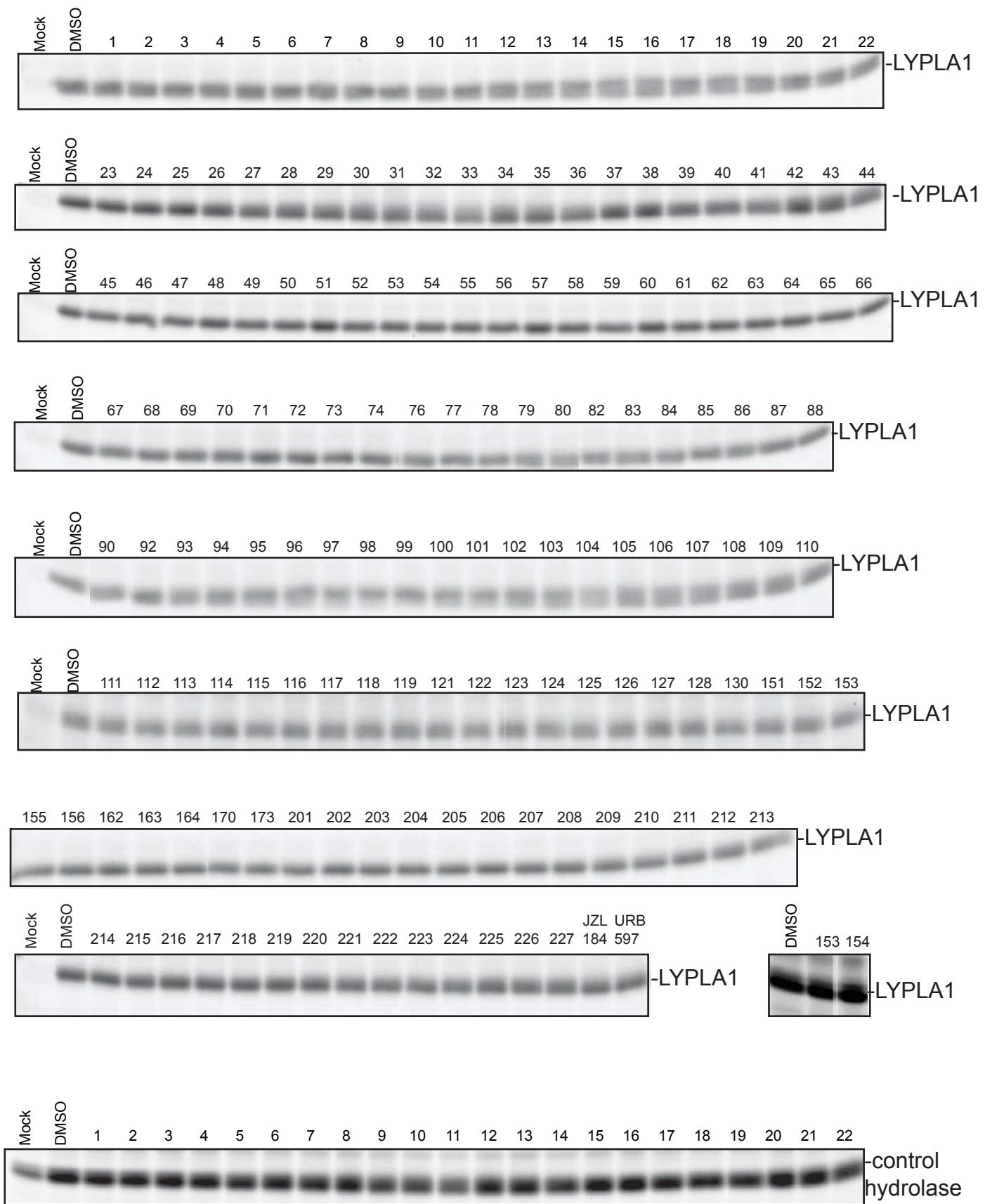
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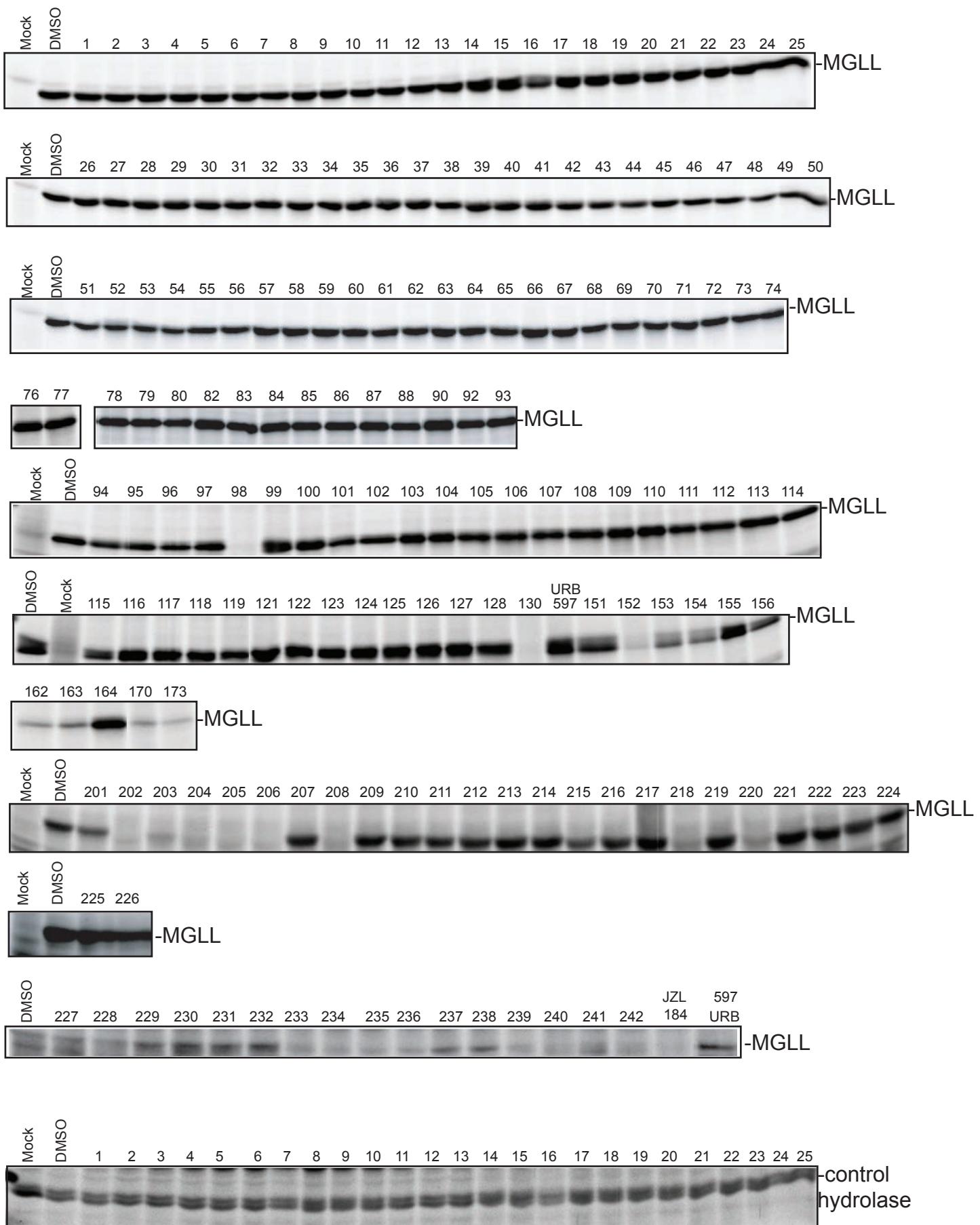
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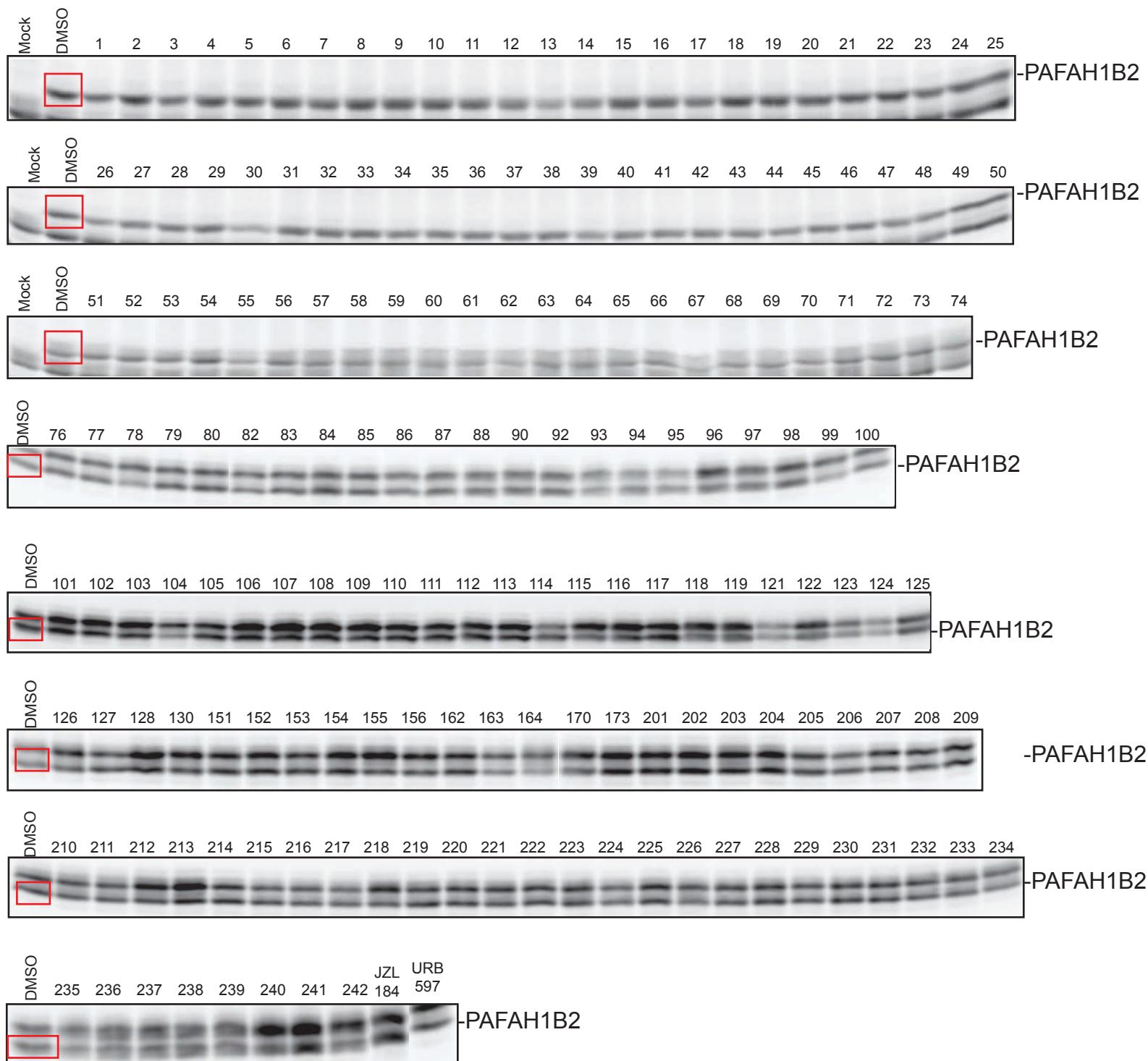
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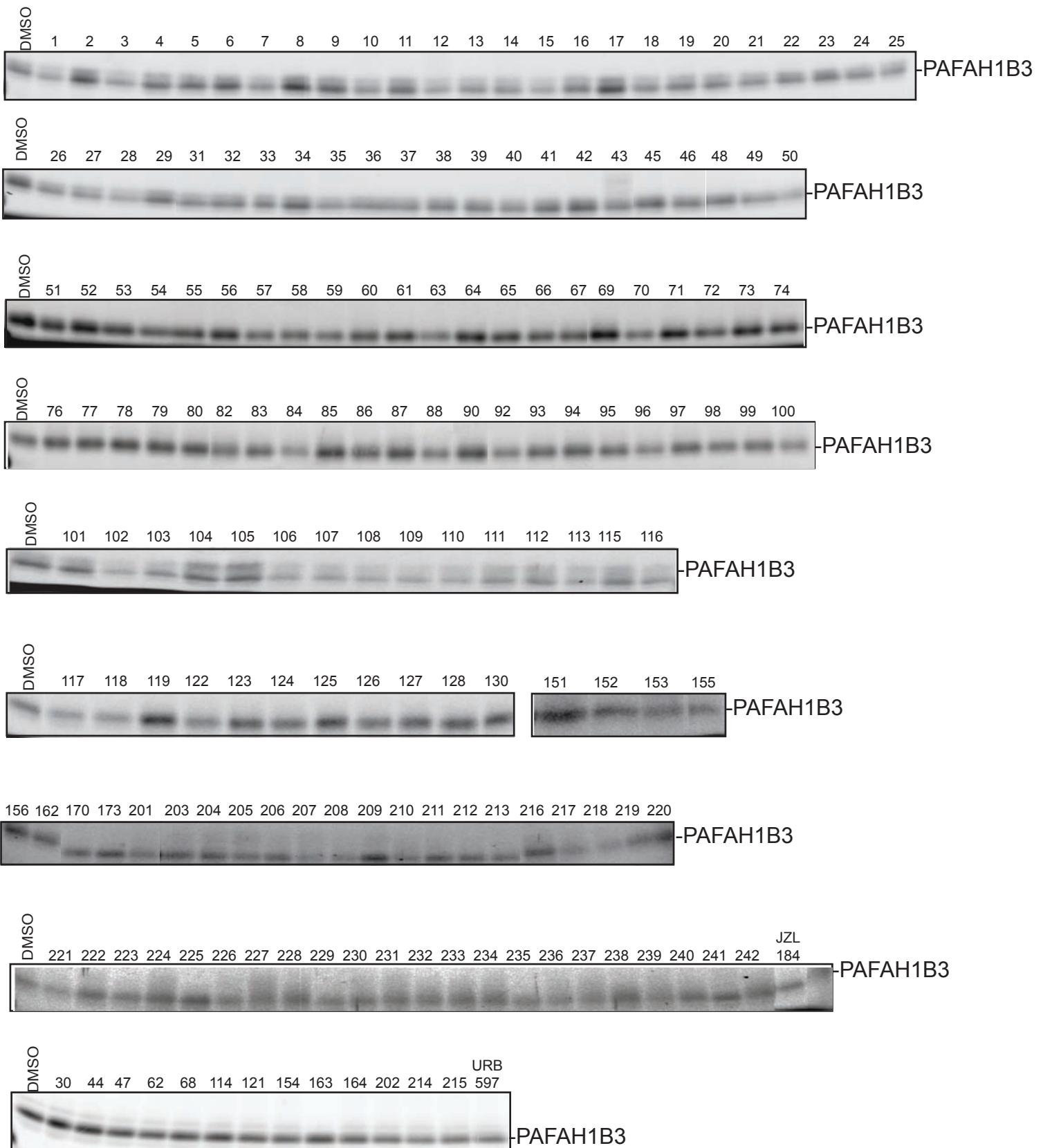
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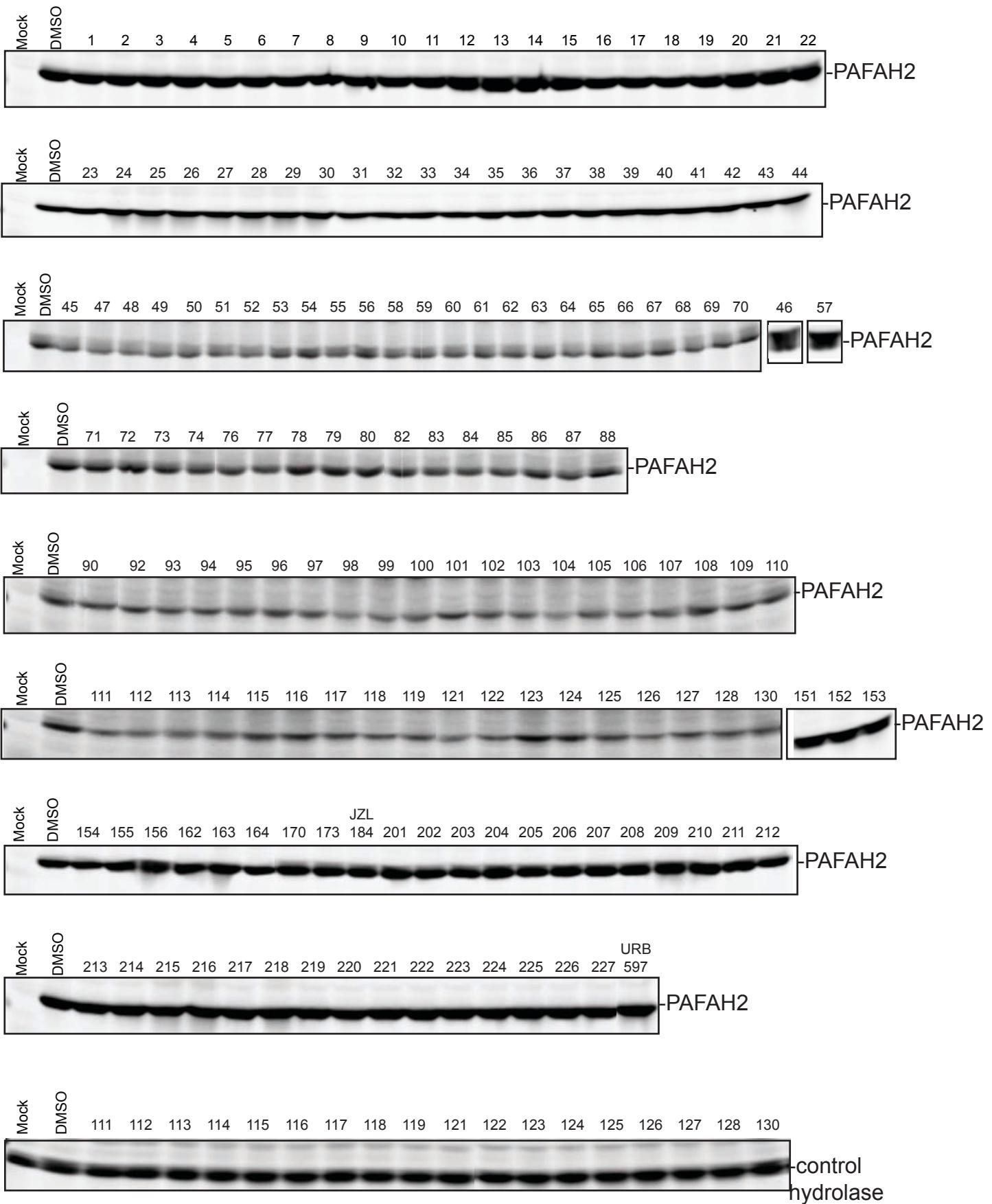
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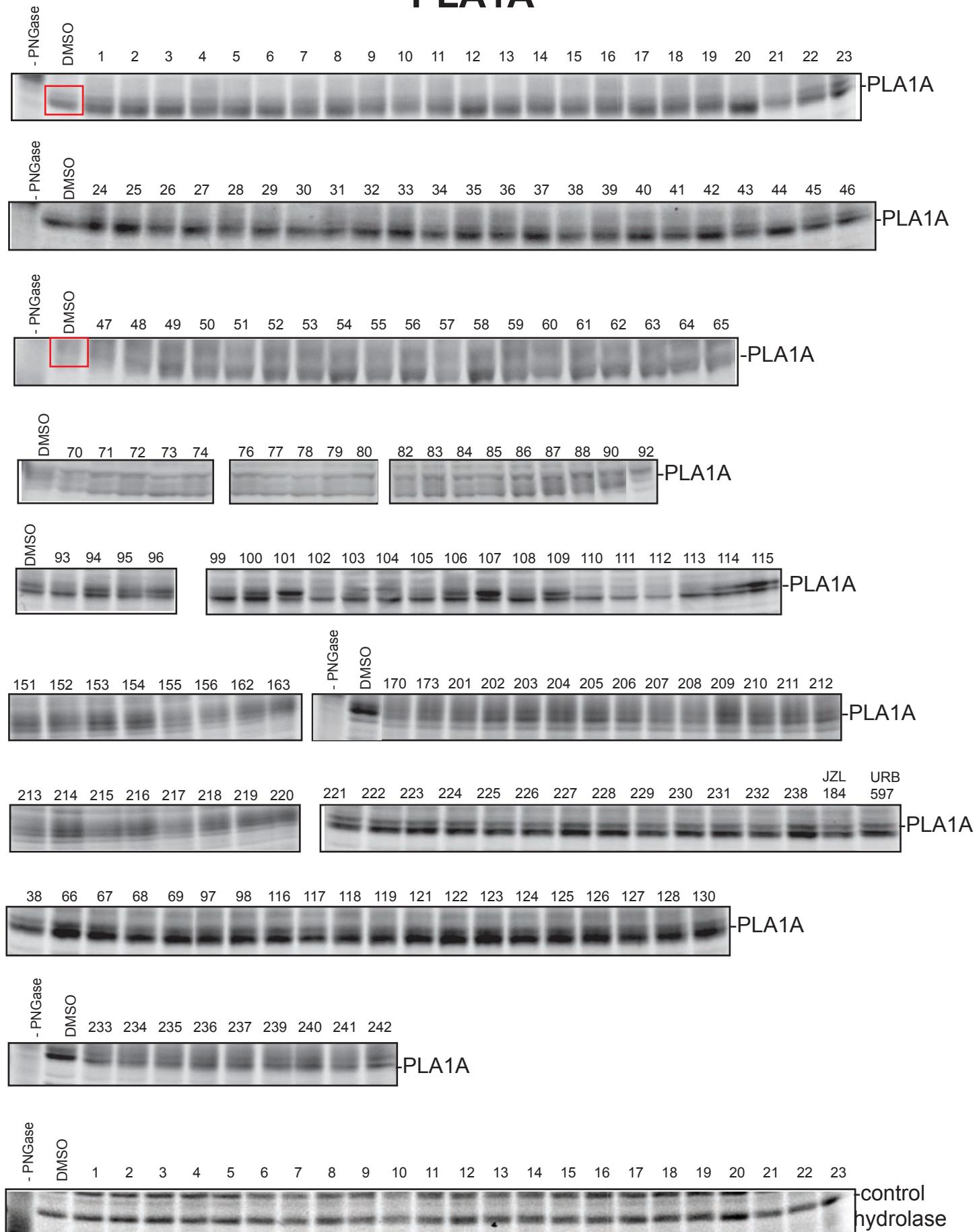
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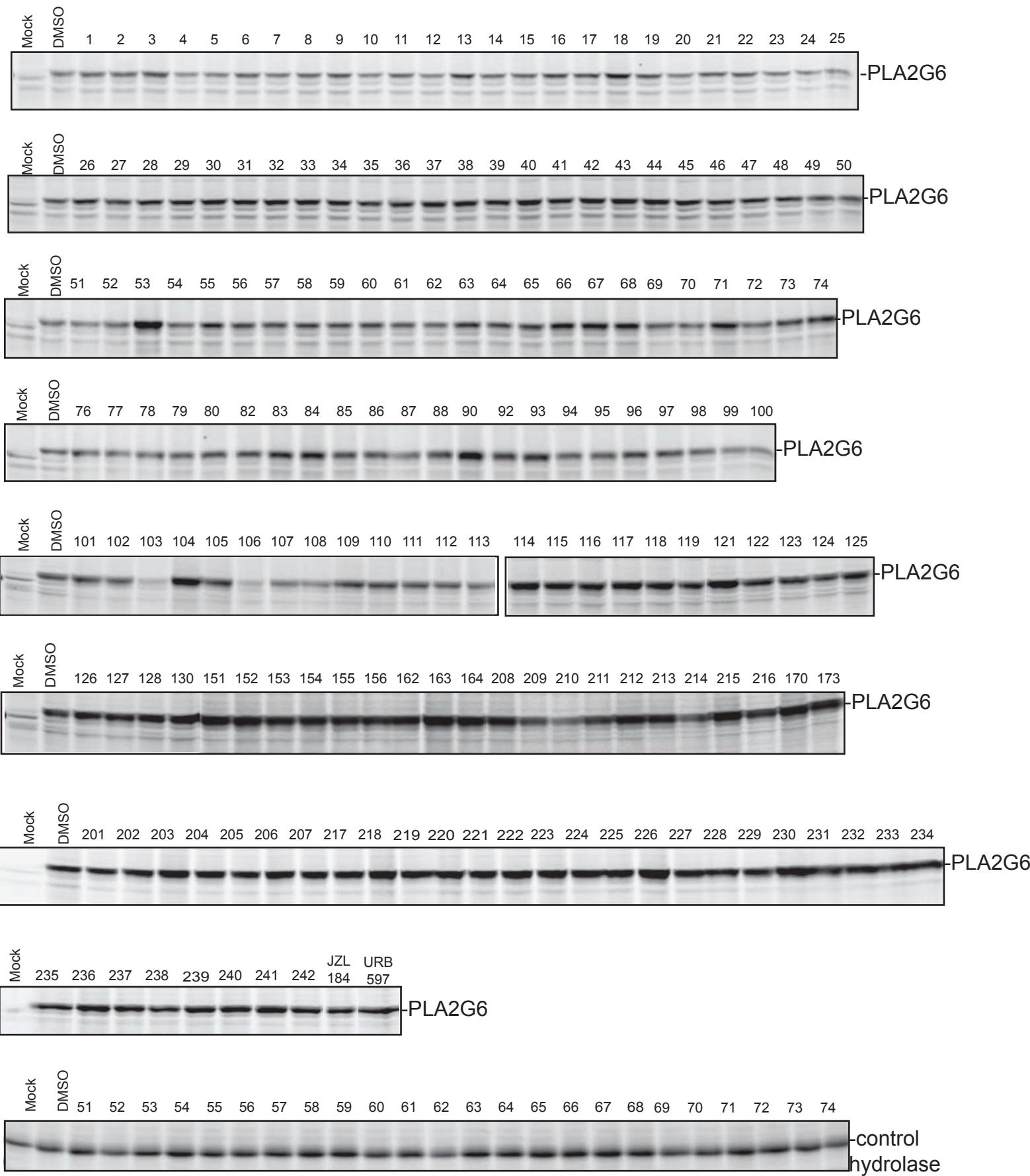
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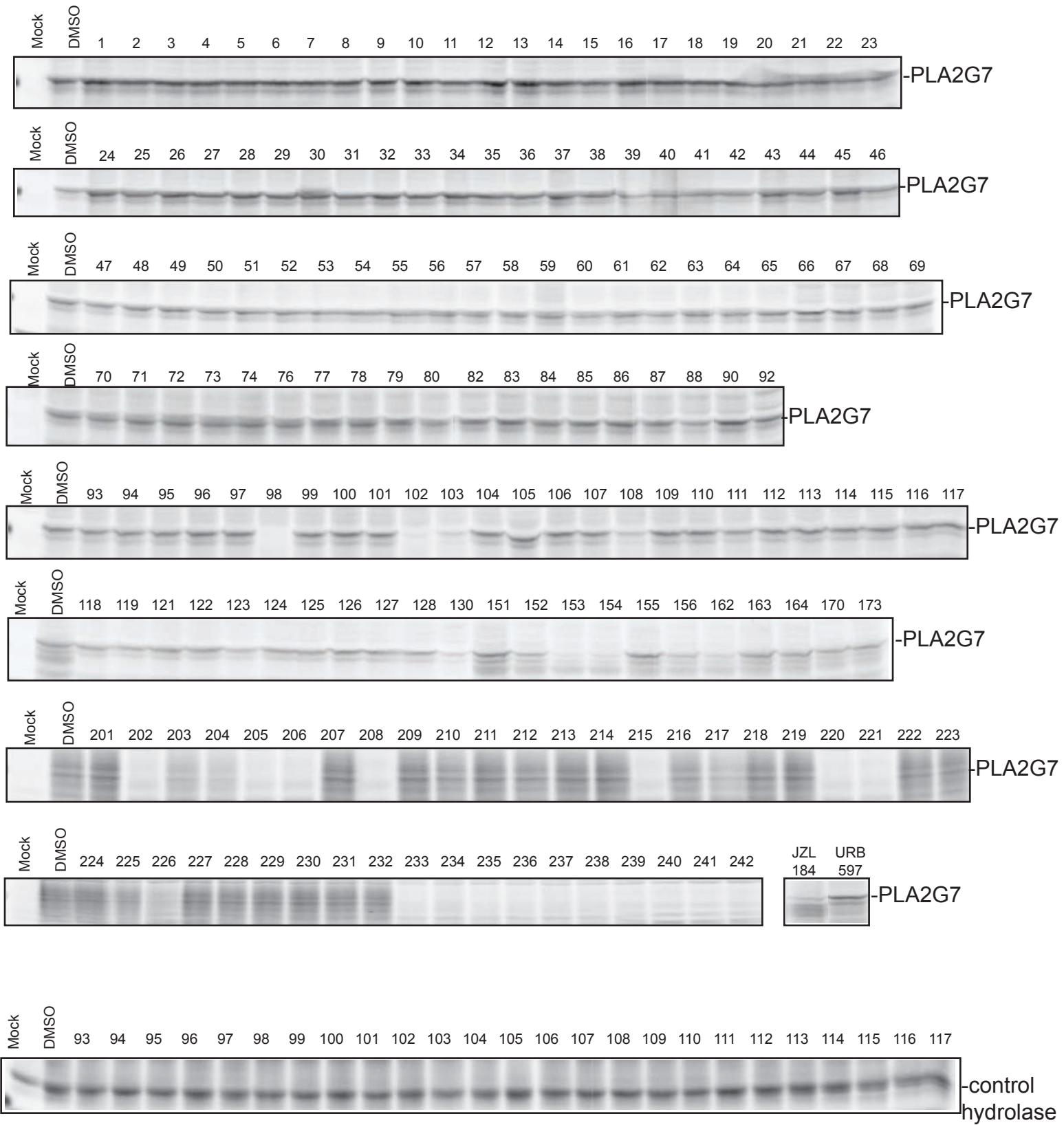
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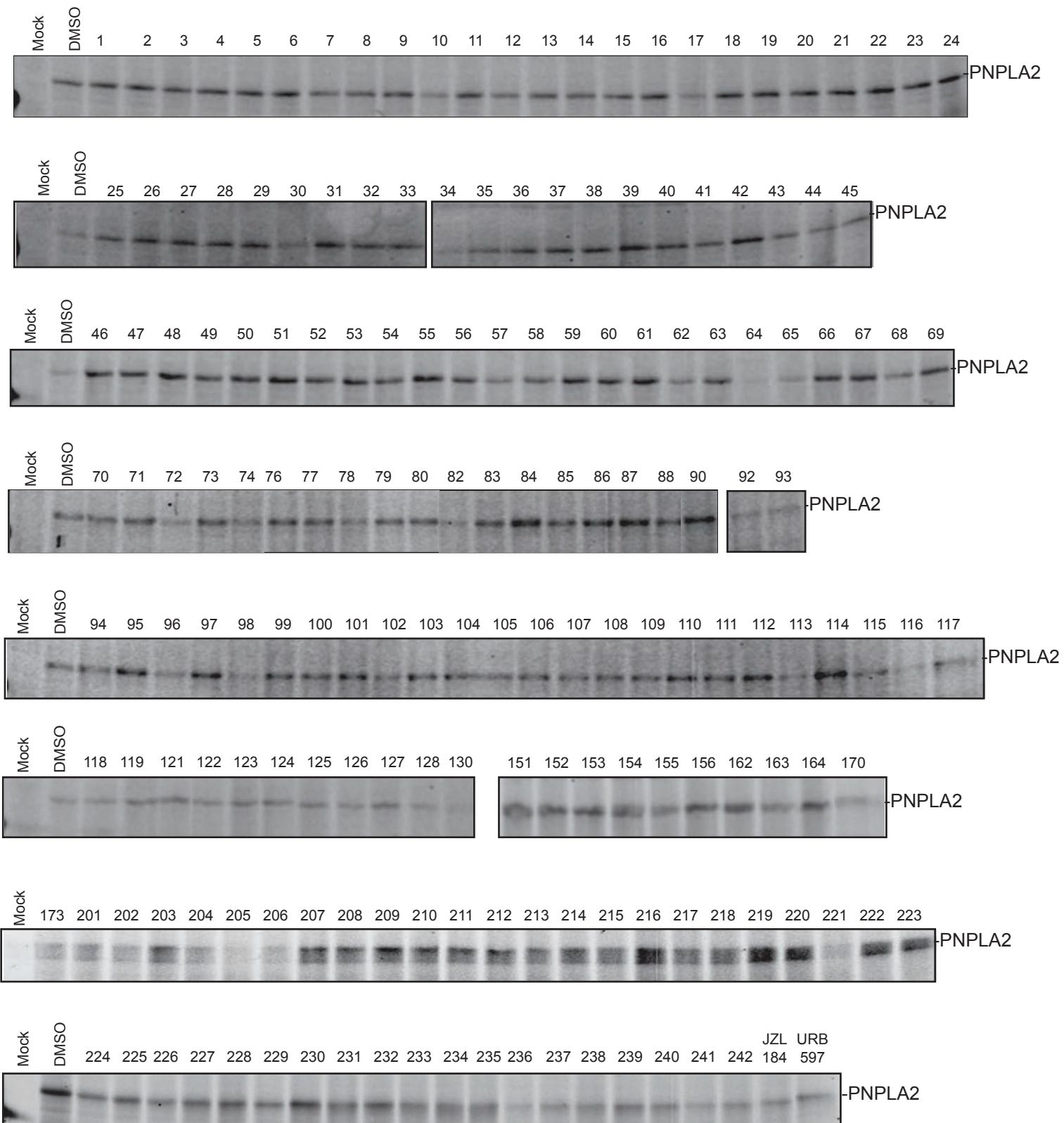
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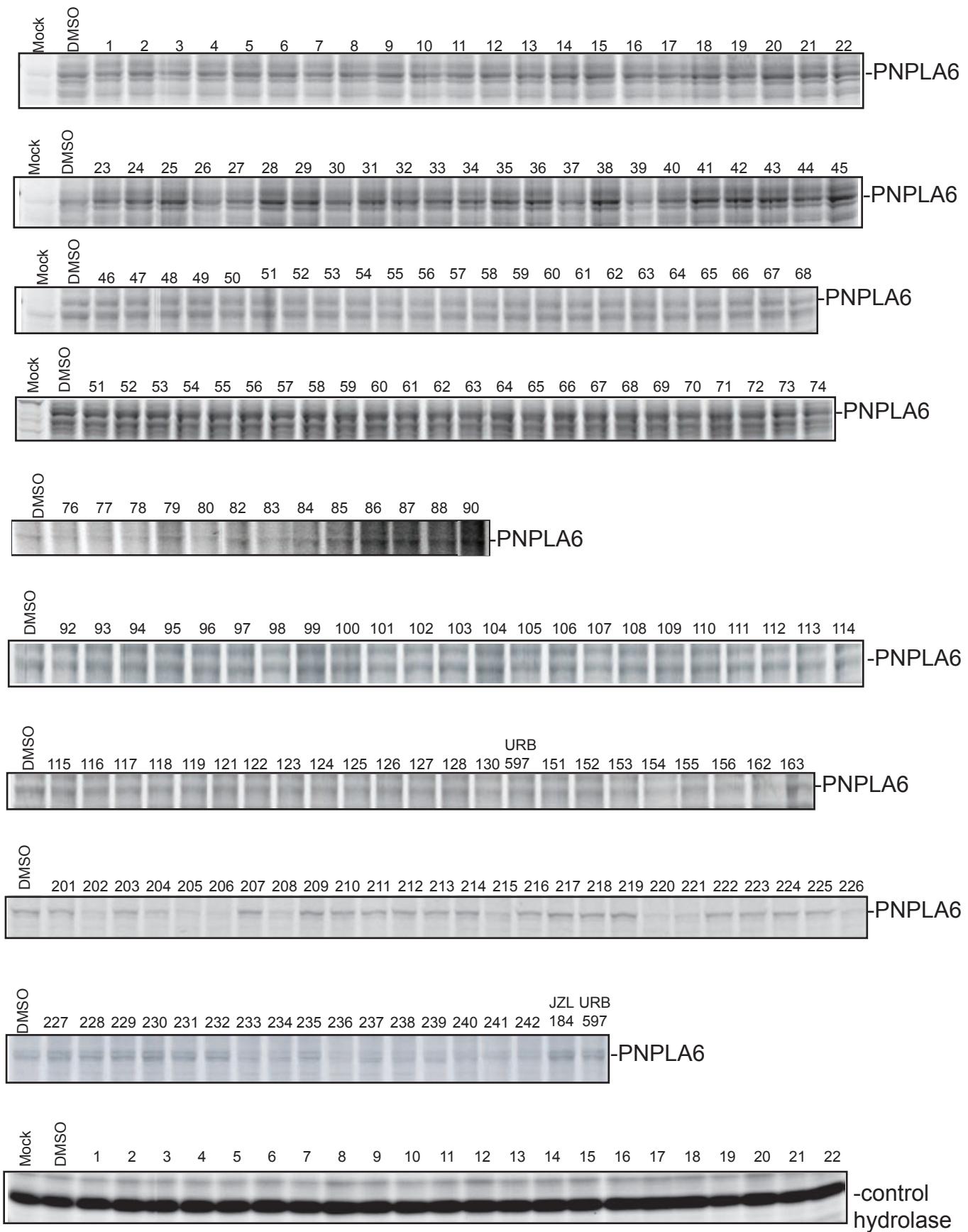
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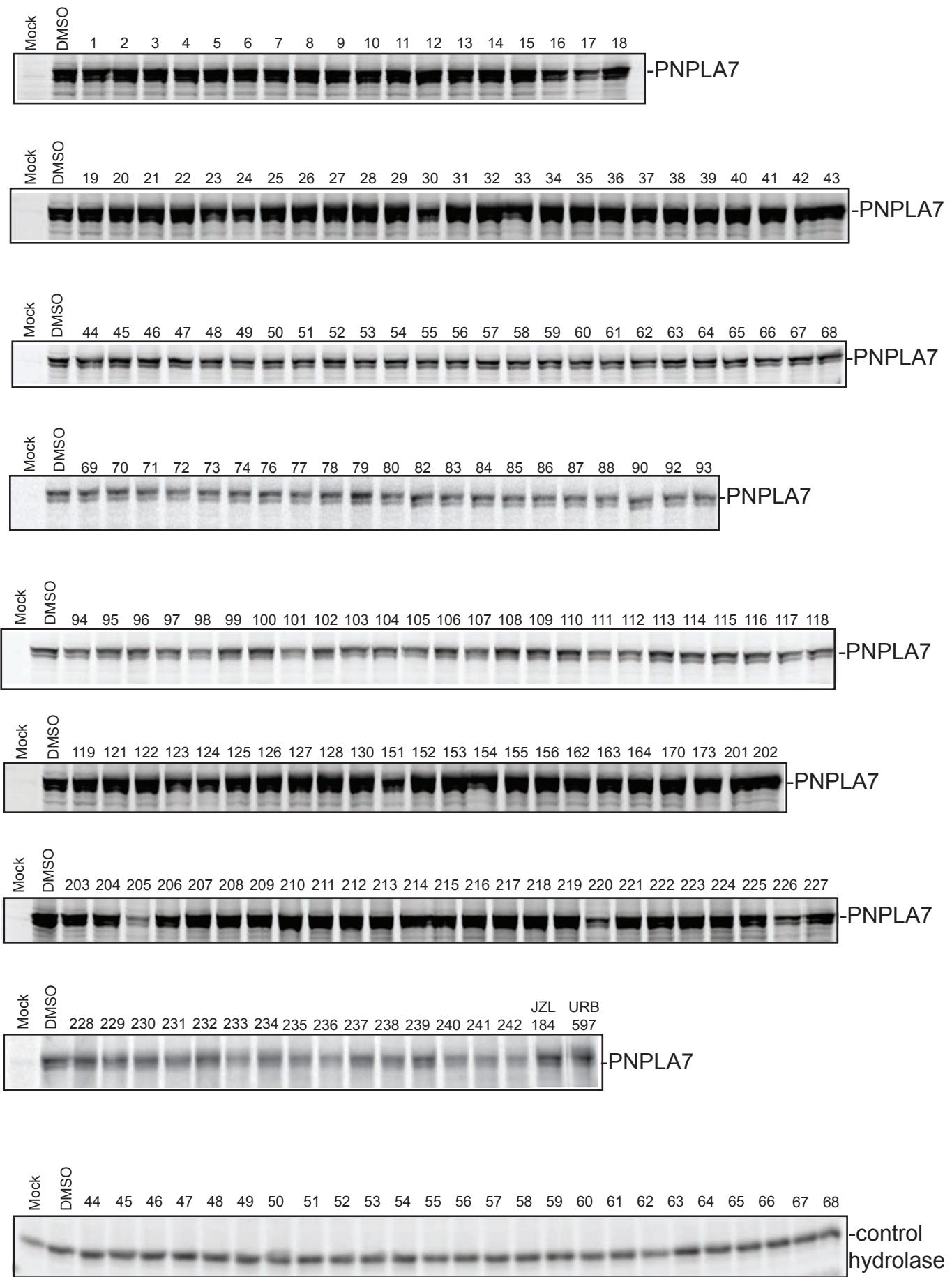
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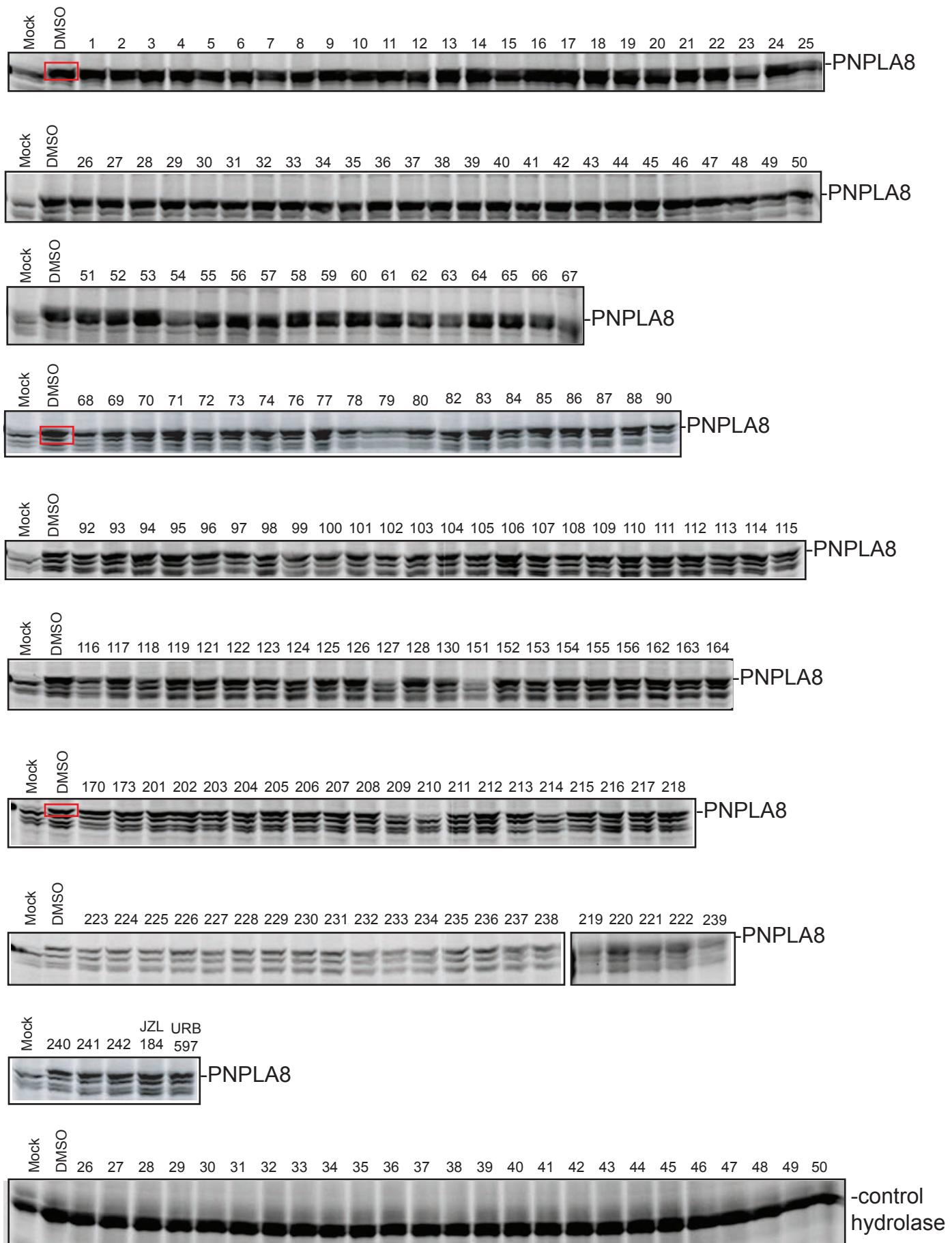
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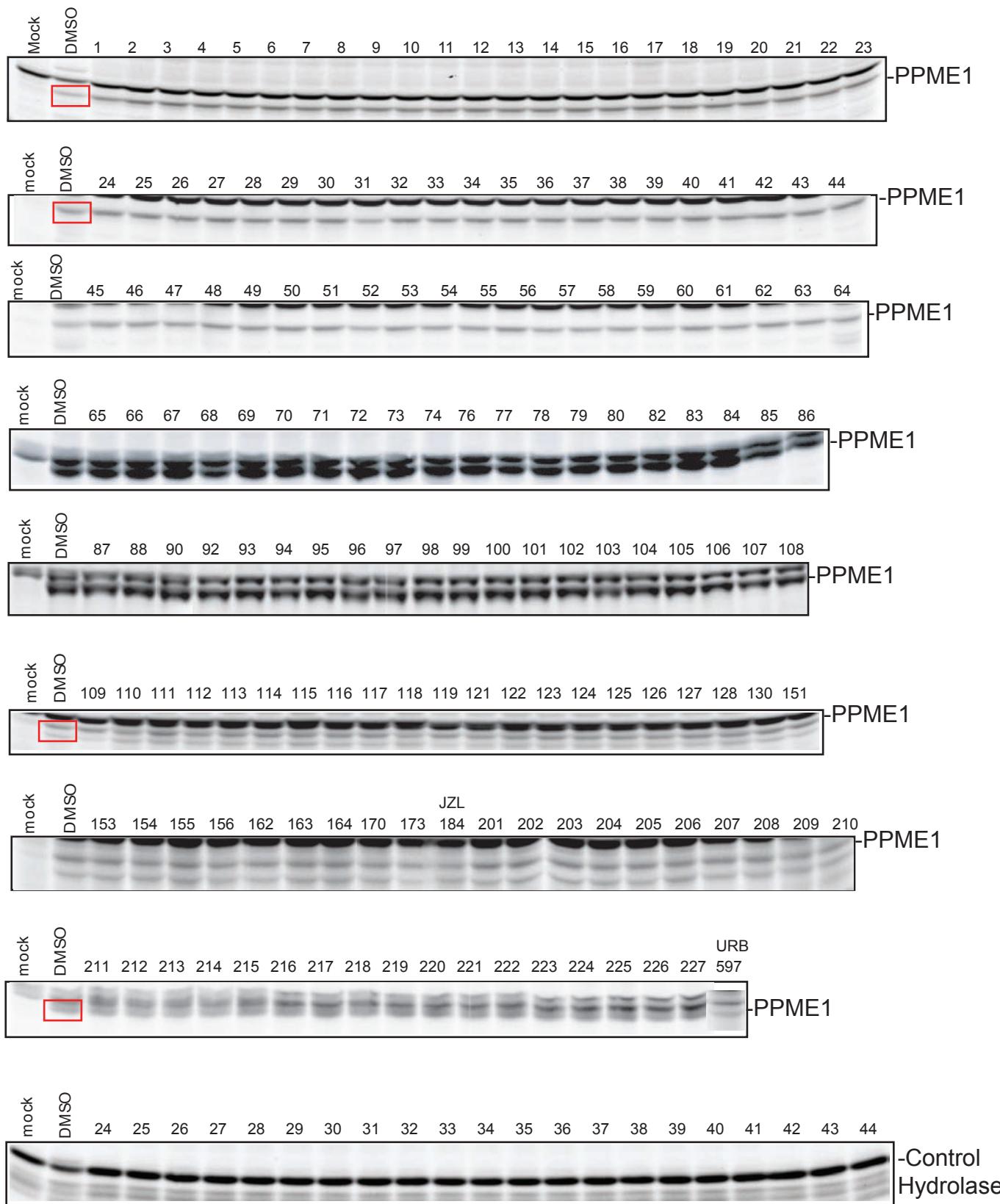
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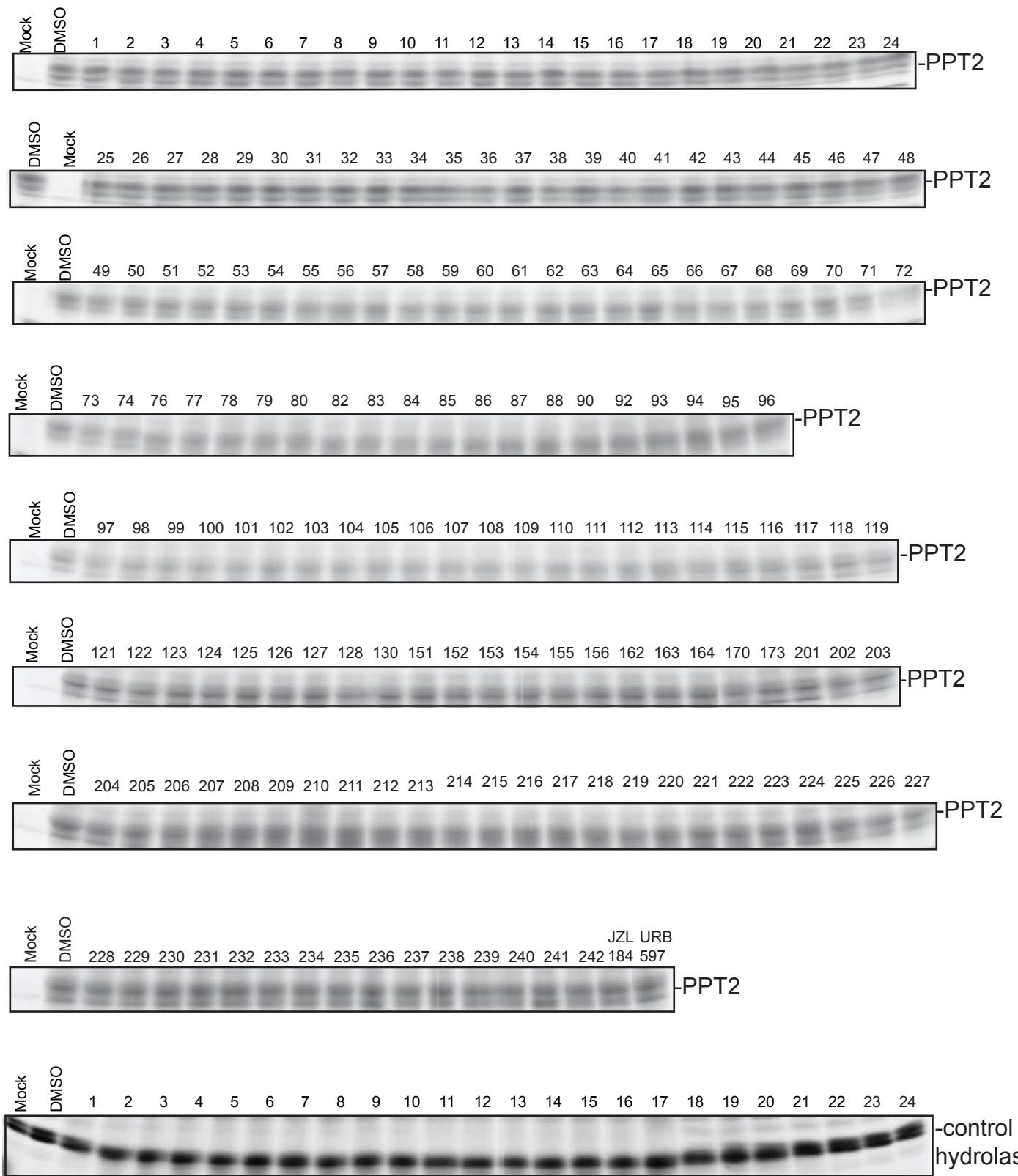
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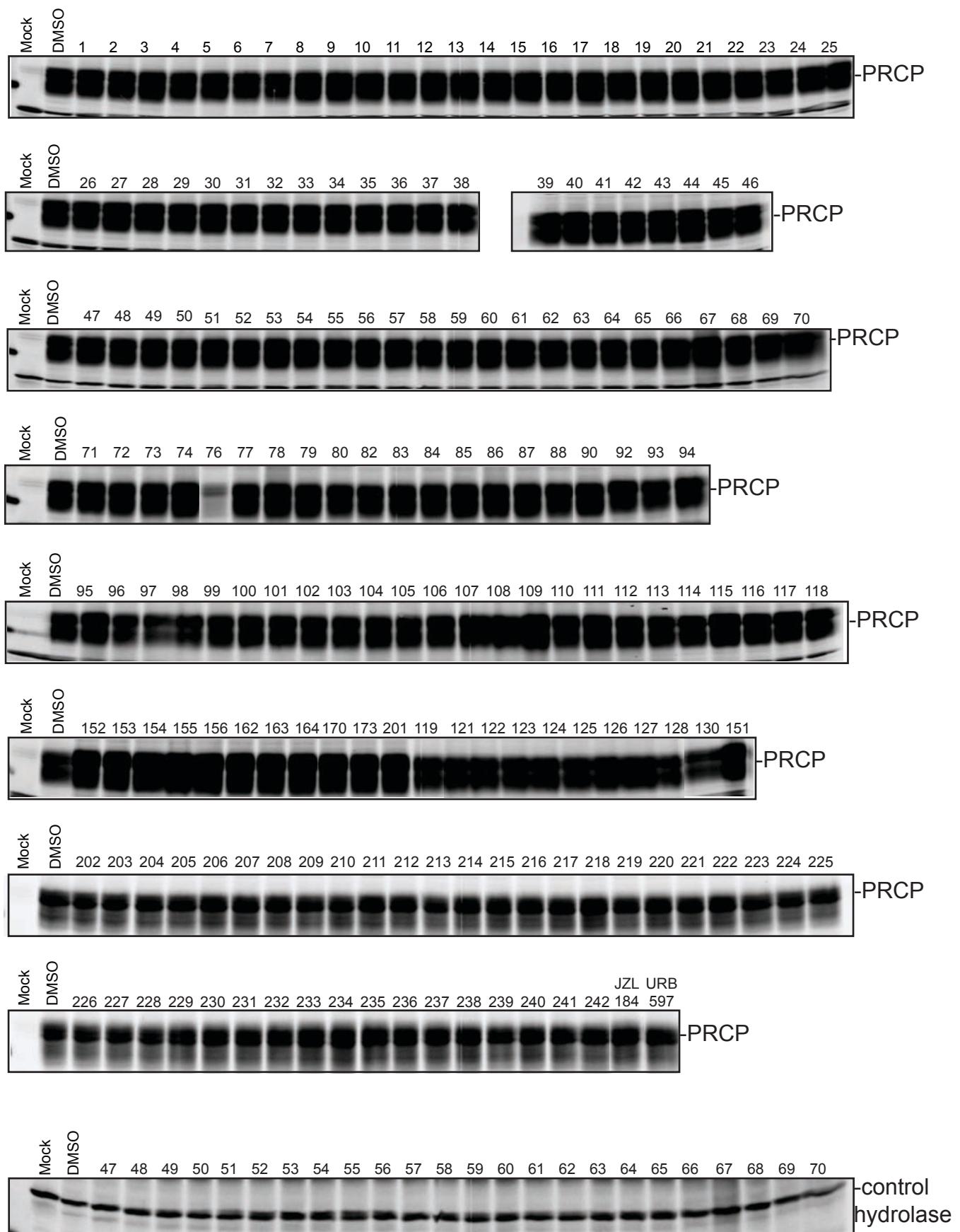
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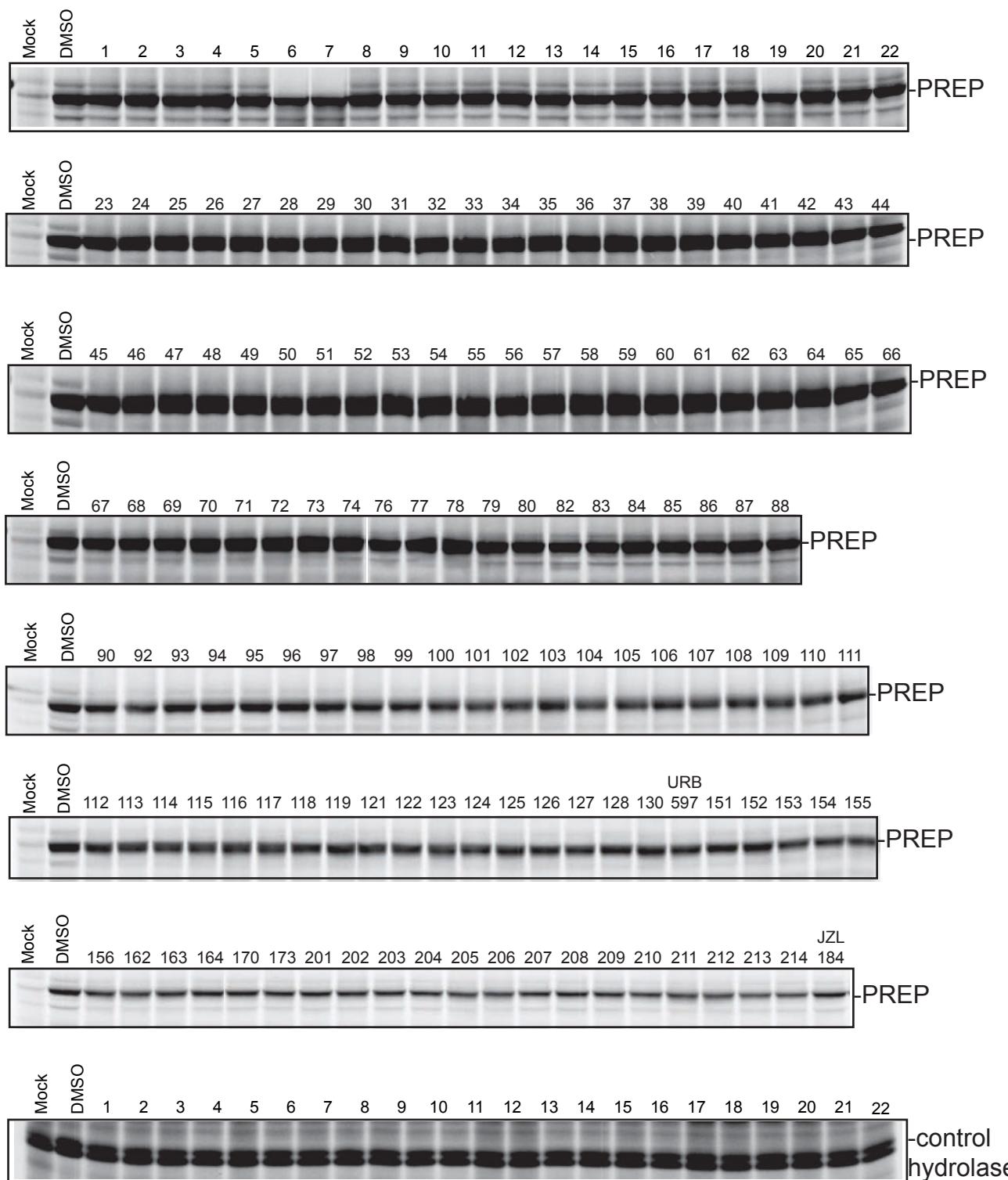
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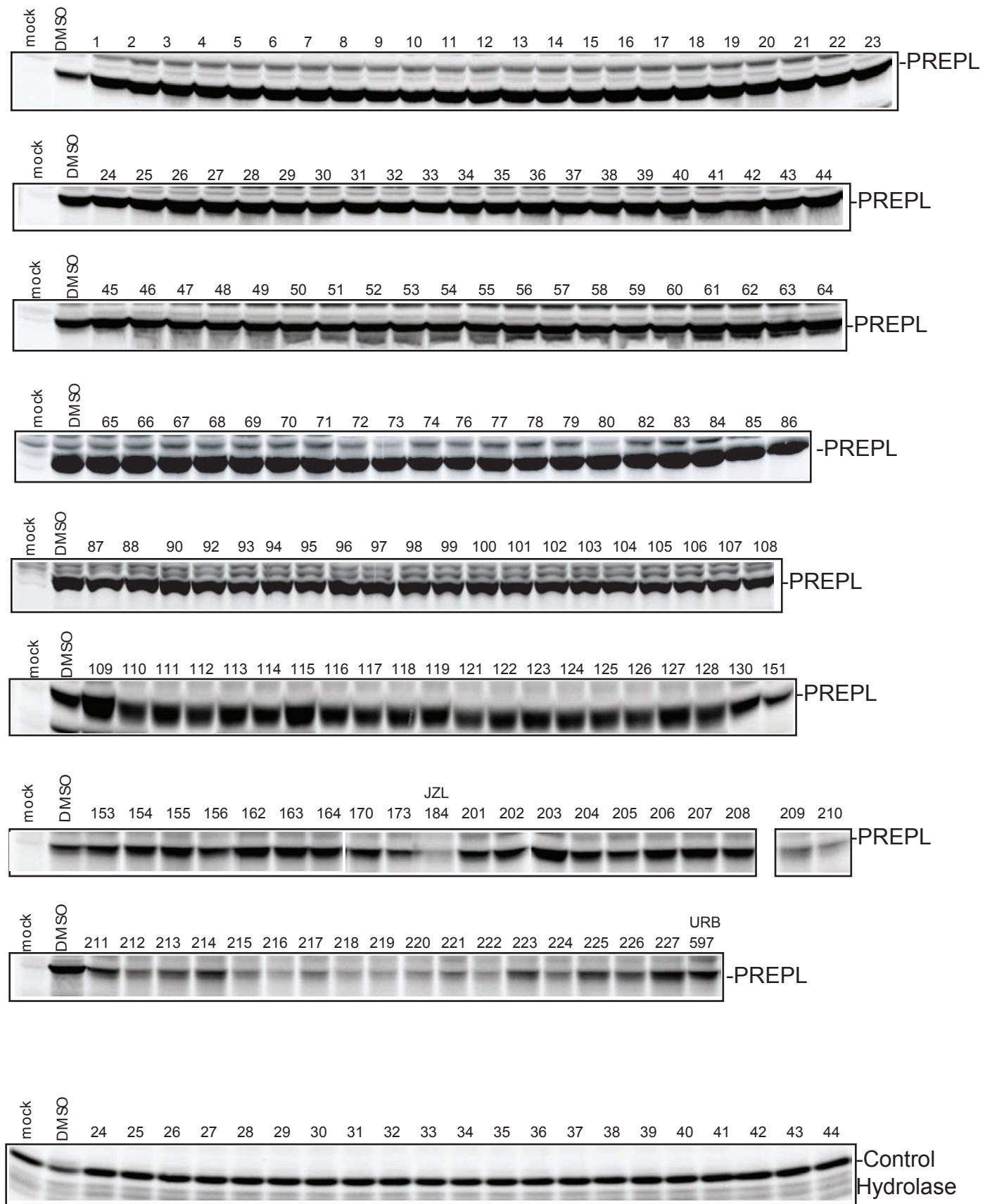
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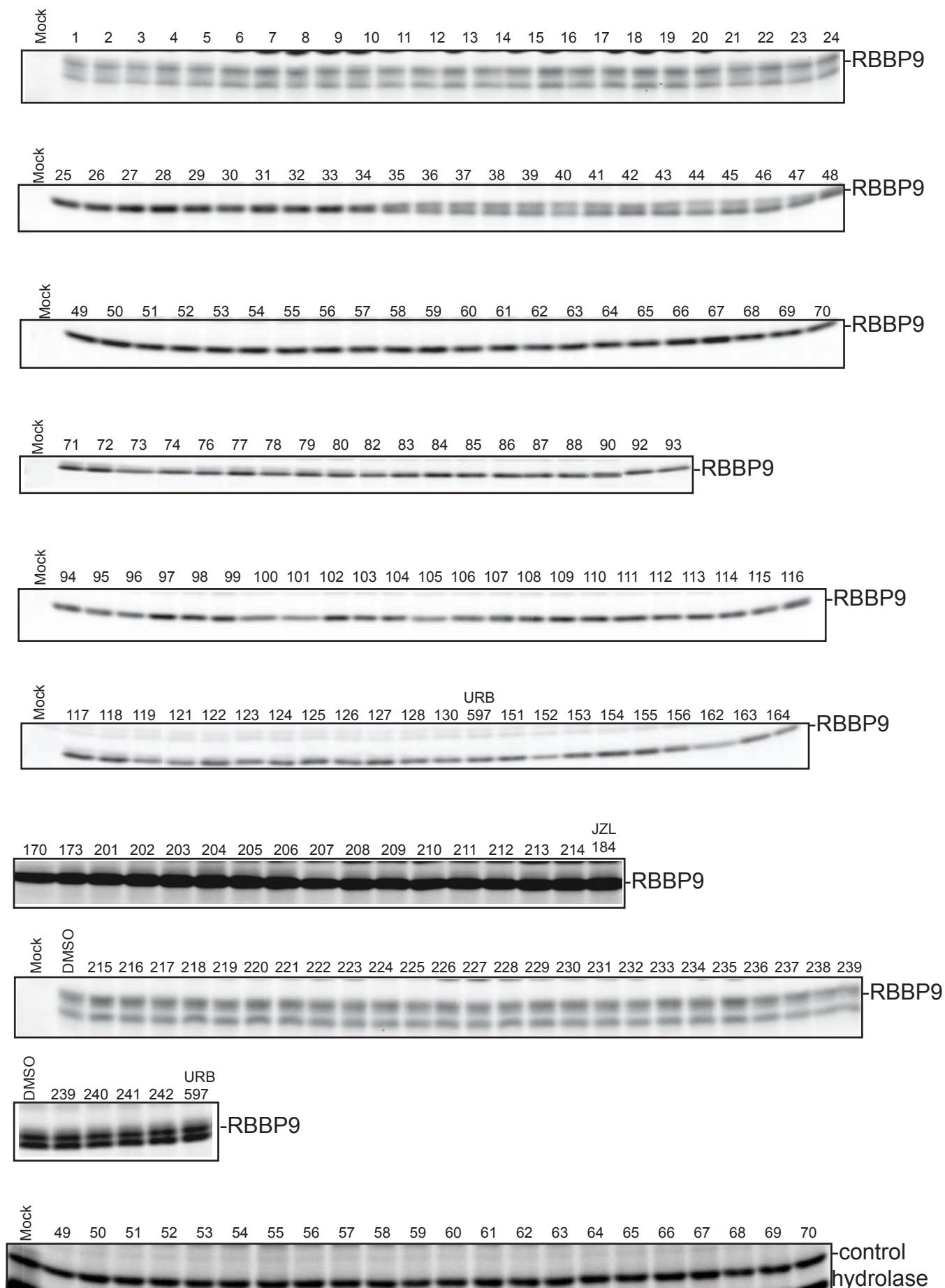
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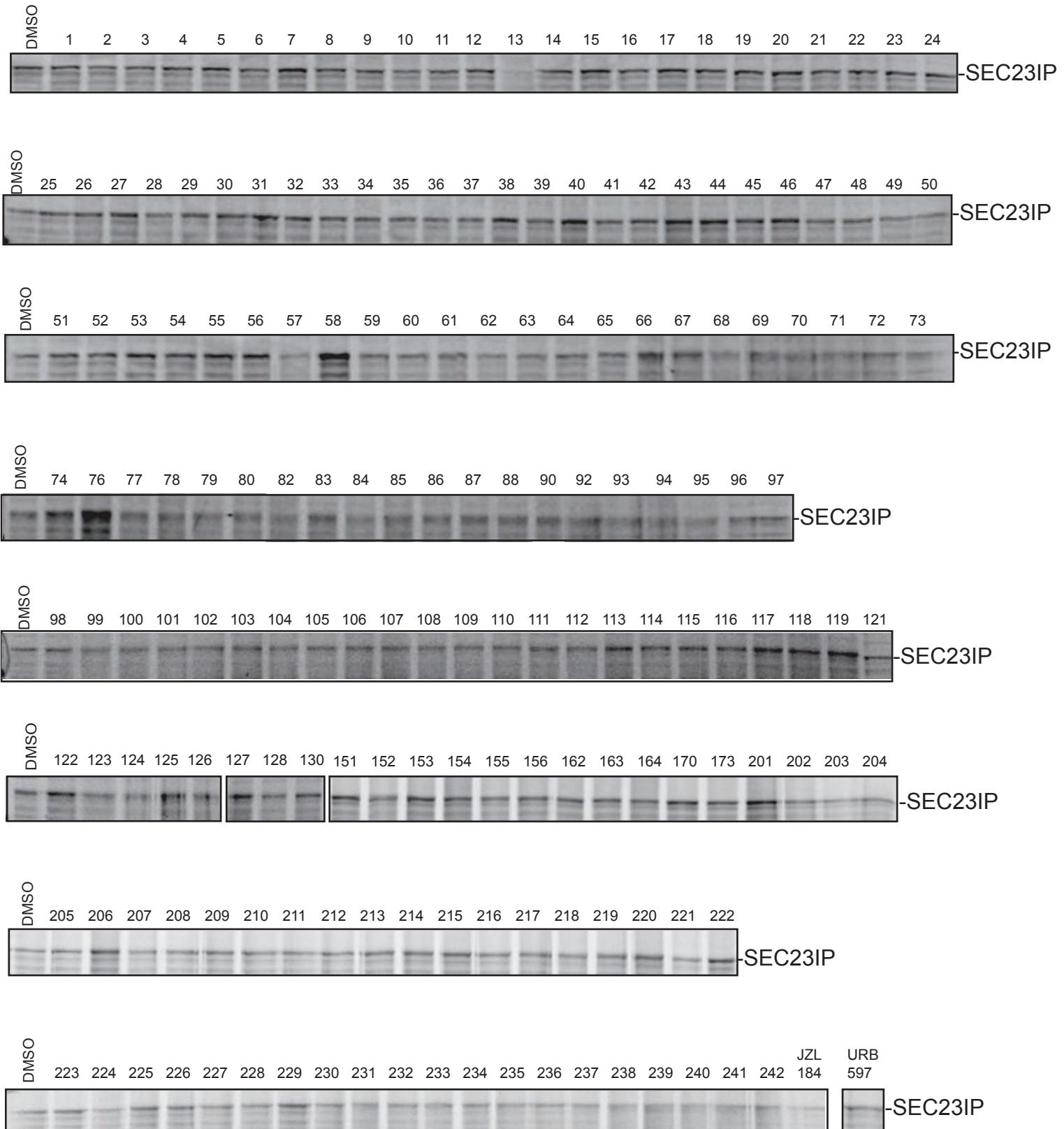
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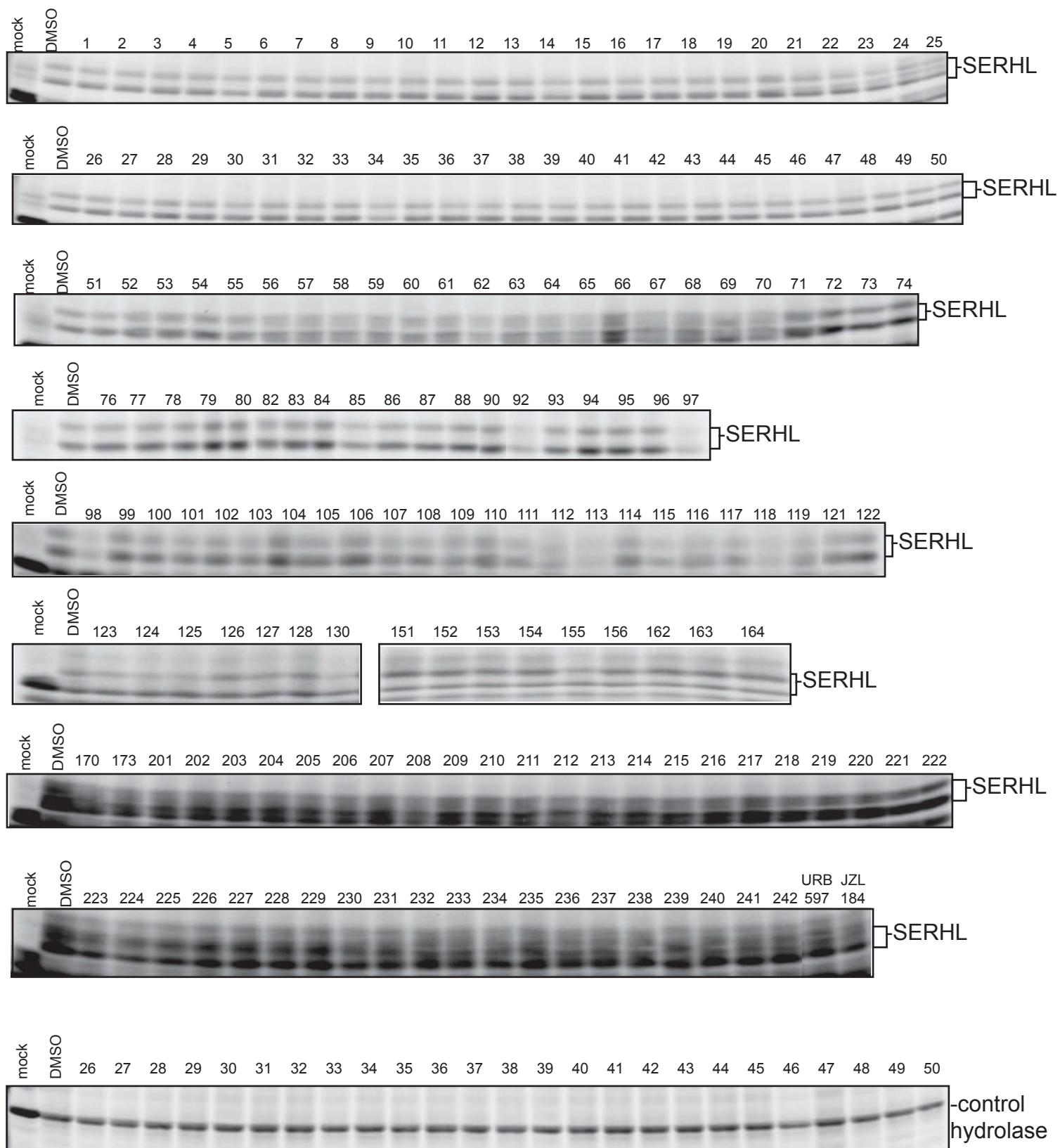
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SEC23IP



SERHL



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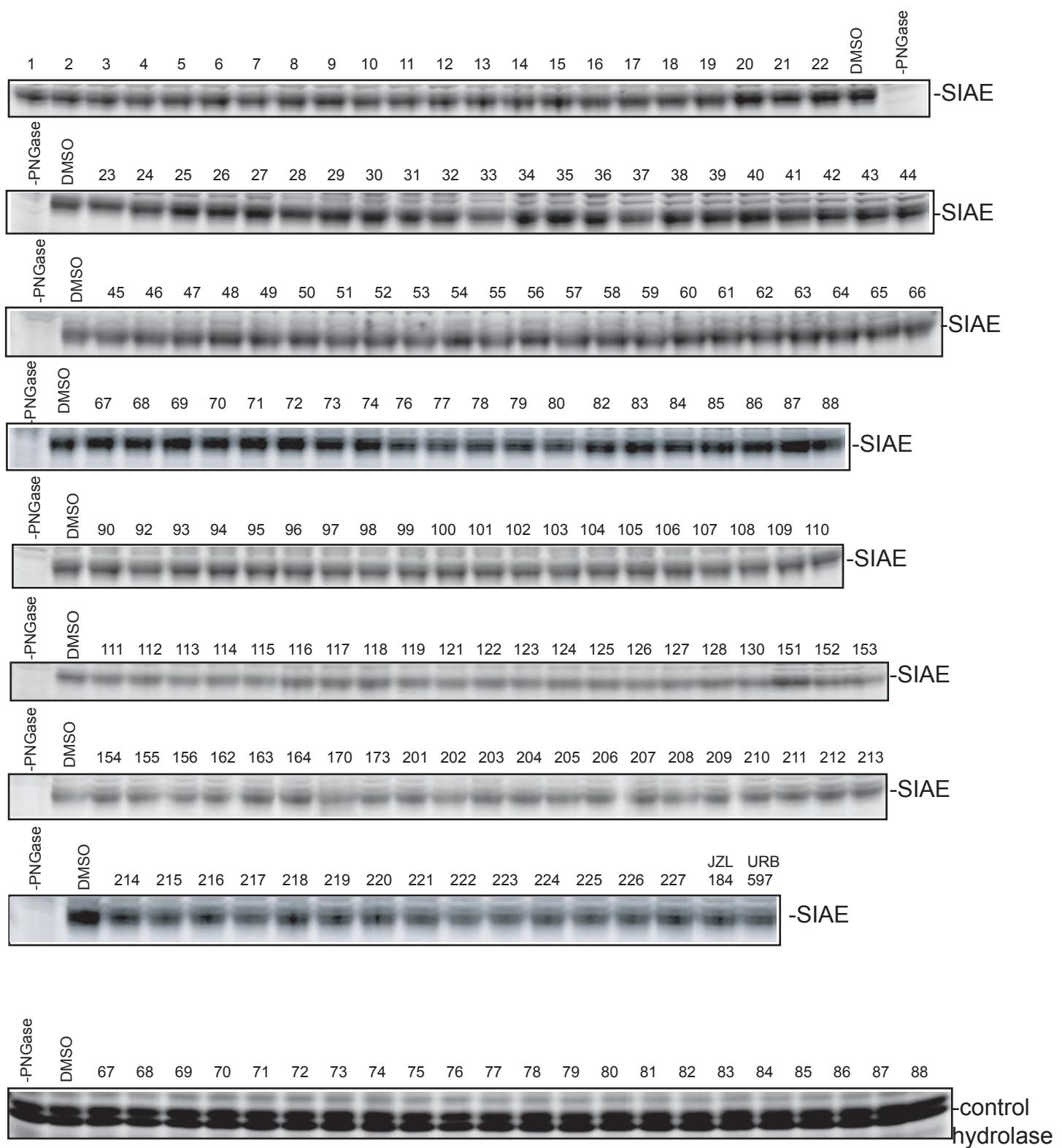


Fig. S5

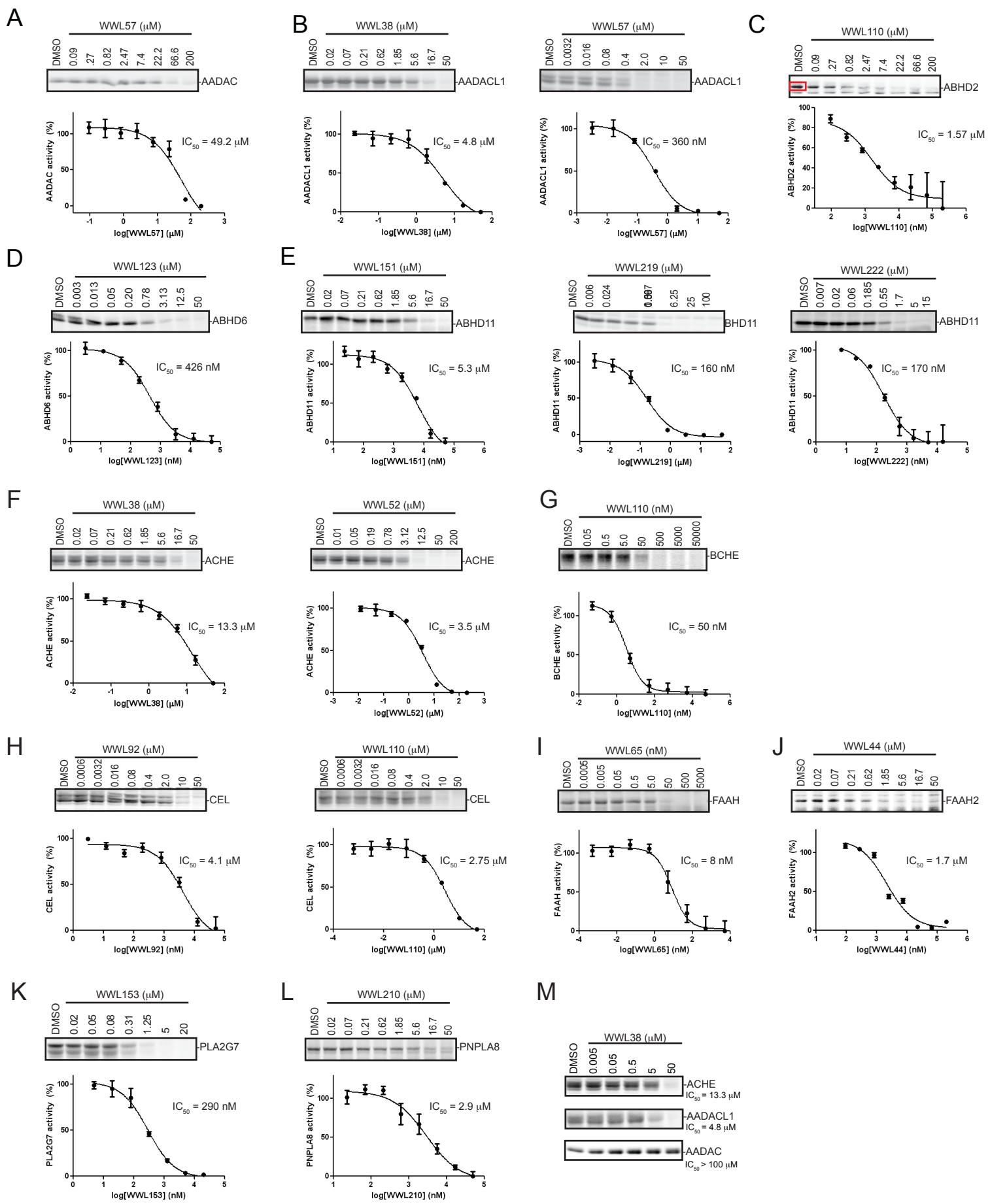
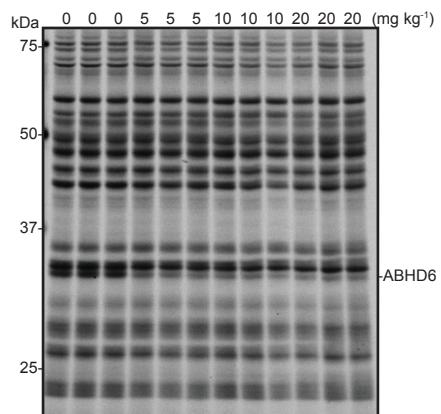


Fig. S6

A



B

